GE Healthcare

Vivid-i™ and Vivid-q™

Service Manual

Vivid-i™ and Vivid-q™ with software version SW 11.xx (BT11)

Operating Documentation

Part Number: R2423164-100
Revision: 6

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Important Precautions

- **THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.**
- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**

WARNING (EN)

- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

- **CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.**
- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**

AVERTISSEMENT (FR)

- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

- **DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.**
- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**

WARNUNG (DE)

- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO (ES)

- **ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.**
- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEHC SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

ATENÇÃO (PT)

- **ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.**
- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A' CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVVERTENZA (IT)

- **IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.**
- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEHC RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

HOIATUS (ET)

- **KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.**
- **KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÕLKETEENUSE OSUTAMISE EEST.**
- **ÄRGE ÜRITAGE SEADMEID TEENINDADA ENNE EELNEVALT KÄESOLEVA TEENINDUSJUHENDIGA TUTVUMIST JA SELLEST ARU SAAMIST.**
- **KÄESOLEVA HOIATUSE EIRAMINE VÕIB PÕHJUSTADA TEENUSEOSUTAJA, OPERAATORI VÕI PATSIENDI VIGASTAMIST ELEKTRILÖÖGI, MEHAANILISE VÕI MUU OHU TAGAJÄRJEL.**

VAROITUS (FI)

- **TÄMÄ HUOLTO-OHJE ON SAATAVILLA VAIN ENGLANNIKSI.**
- **JOS ASIAKKAAN PALVELUNTARJOAJA VAATII MUUTA KUIN ENGLANNINKIELISTÄ MATERIAALIA, TARVITTAVAN KÄÄNNÖKSEN HANKKIMINEN ON ASIAKKAAN VASTUULLA.**
- **ÄLÄ YRITÄ KORJATA LAITTEISTOA ENNEN KUIN OLET VARMASTI LUKENUT JA YMMÄRTÄNYT TÄMÄN HUOLTO-OHJEEN.**
- **MIKÄLI TÄTÄ VAROITUSTA EI NOUDATETA, SEURAUKSENA VOI OLLA PALVELUNTARJOAJAN, LAITTEISTON KÄYTTÄJÄN TAI POTILAAN VAHINGOITTUMINEN SÄHKÖISKUN, MEKAANISEN VIAN TAI MUUN VAARATILANTEEN VUOKSI.**

ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)

- **ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ ΔΙΑΤΙΘΕΤΑΙ ΣΤΑ ΑΓΓΛΙΚΑ ΜΟΝΟ.**
- **ΕΑΝ ΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ ΕΝΟΣ ΠΕΛΑΤΗ ΑΠΑΙΤΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕ ΓΛΩΣΣΑ ΕΚΤΟΣ ΤΩΝ ΑΓΓΛΙΚΩΝ, ΑΠΟΤΕΛΕΙ ΕΥΘΥΝΗ ΤΟΥ ΠΕΛΑΤΗ ΝΑ ΠΑΡΕΧΕΙ ΥΠΗΡΕΣΙΕΣ ΜΕΤΑΦΡΑΣΗΣ.**
- **ΜΗΝ ΕΠΙΧΕΙΡΗΣΕΤΕ ΤΗΝ ΕΚΤΕΛΕΣΗ ΕΡΓΑΣΙΩΝ ΣΕΡΒΙΣ ΣΤΟΝ ΕΞΟΠΛΙΣΜΟ ΕΚΤΟΣ ΕΑΝ ΕΧΕΤΕ ΣΥΜΒΟΥΛΕΥΤΕΙ ΚΑΙ ΕΧΕΤΕ ΚΑΤΑΝΟΗΣΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ.**
- **ΕΑΝ ΔΕ ΛΑΒΕΤΕ ΥΠΟΨΗ ΤΗΝ ΠΡΟΕΙΔΟΠΟΙΗΣΗ ΑΥΤΗ, ΕΝΔΕΧΕΤΑΙ ΝΑ ΠΡΟΚΛΗΘΕΙ ΤΡΑΥΜΑΤΙΣΜΟΣ ΣΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ, ΣΤΟ ΧΕΙΡΙΣΤΗ Ή ΣΤΟΝ ΑΣΘΕΝΗ ΑΠΟ ΗΛΕΚΤΡΟΠΛΗΞΙΑ, ΜΗΧΑΝΙΚΟΥΣ Ή ΑΛΛΟΥΣ ΚΙΝΔΥΝΟΥΣ.**

FIGYELMEZTETÉS (HU)

- **EZEN KARBANTARTÁSI KÉZIKÖNYV KIZÁRÓLAG ANGOL NYELVEN ÉRHETŐ EL.**
- **HA A VEVŐ SZOLGÁLTATÓJA ANGOLTÓL ELTÉRŐ NYELVRE TART IGÉNYT, AKKOR A VEVŐ FELELŐSSÉGE A FORDÍTÁS ELKÉSZÍTTETÉSE.**
- **NE PRÓBÁLJA ELKEZDENI HASZNÁLNI A BERENDEZÉST, AMÍG A KARBANTARTÁSI KÉZIKÖNYVBEN LEÍRTAKAT NEM ÉRTELMEZTÉK.**
- **EZEN FIGYELMEZTETÉS FIGYELMEN KÍVÜL HAGYÁSA A SZOLGÁLTATÓ, MŰKÖDTETŐ VAGY A BETEG ÁRAMÜTÉS, MECHANIKAI VAGY EGYÉB VESZÉLYHELYZET MIATTI SÉRÜLÉSÉT EREDMÉNYEZHETI.**

VIÐVÖRUN (IS)

- **ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.**
- **EF ÞJÓNUSTUAÐILI VIÐSKIPTAMANNS ÞARFNAST ANNARS TUNGUMÁLS EN ENSKU, ER ÞAÐ Á ÁBYRGÐ VIÐSKIPTAMANNS AÐ ÚTVEGA ÞÝÐINGU.**
- **REYNIÐ EKKI AÐ ÞJÓNUSTA TÆKIÐ NEMA EFTIR AÐ HAFA SKOÐAÐ OG SKILIÐ ÞESSA ÞJÓNUSTUHANDBÓK.**
- **EF EKKI ER FARIÐ AÐ ÞESSARI VIÐVÖRUN GETUR ÞAÐ VALDIÐ MEIÐSLUM ÞJÓNUSTUVEITANDA, STJÓRNANDA EÐA SJÚKLINGS VEGNA RAFLOSTS, VÉLRÆNNAR EÐA ANNARRAR HÆTTU.**

VÝSTRAHA (CS)

- **TENTO SERVISNÍ NÁVOD EXISTUJE POUZE V ANGLICKÉM JAZYCE.**
- **V PŘÍPADĚ, ŽE POSKYTOVATEL SLUŽEB ZÁKAZNÍKŮM POTŘEBUJE NÁVOD V JINÉM JAZYCE, JE ZAJIŠTĚNÍ PŘEKLADU DO ODPOVÍDAJÍCÍHO JAZYKA ÚKOLEM ZÁKAZNÍKA.**
- **NEPROVÁDĚJTE ÚDRŽBU TOHOTO ZAŘÍZENÍ, ANIŽ BYSTE SI PŘEČETLI TENTO SERVISNÍ NÁVOD A POCHOPILI JEHO OBSAH.**
- **V PŘÍPADĚ NEDODRŽOVÁNÍ TÉTO VÝSTRAHY MŮŽE DOJÍT ÚRAZU ELEKTRICKÁM PROUDEM PRACOVNÍKA POSKYTOVATELE SLUŽEB, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHOP PROUDU, RESPEKTIVE VLIVEM K RIZIKU MECHANICKÉHO POŠKOZENÍ NEBO JINÉMU RIZIKU.**

ADVARSEL (DA)

- **DENNE SERVICEMANUAL FINDES KUN PÅ ENGELSK.**
- **HVIS EN KUNDES TEKNIKER HAR BRUG FOR ET ANDET SPROG END ENGELSK, ER DET KUNDENS ANSVAR AT SØRGE FOR OVERSÆTTELSE.**
- **FORSØG IKKE AT SERVICERE UDSTYRET MEDMINDRE DENNE SERVICEMANUAL ER BLEVET LÆST OG FORSTÅET.**
- **MANGLENDE OVERHOLDELSE AF DENNE ADVARSEL KAN MEDFØRE SKADE PÅ GRUND AF ELEKTRISK, MEKANISK ELLER ANDEN FARE FOR TEKNIKEREN, OPERATØREN ELLER PATIENTEN.**

WAARSCHUWING (NL)

- **DEZE ONDERHOUDSHANDLEIDING IS ENKEL IN HET ENGELS VERKRIJGBAAR.**
- **ALS HET ONDERHOUDSPERSONEEL EEN ANDERE TAAL VEREIST, DAN IS DE KLANT VERANTWOORDELIJK VOOR DE VERTALING ERVAN.**
- **PROBEER DE APPARATUUR NIET TE ONDERHOUDEN VOORDAT DEZE ONDERHOUDSHANDLEIDING WERD GERAADPLEEGD EN BEGREPEN IS.**
- **INDIEN DEZE WAARSCHUWING NIET WORDT OPGEVOLGD, ZOU HET ONDERHOUDSPERSONEEL, DE OPERATOR OF EEN PATIËNT GEWOND KUNNEN RAKEN ALS GEVOLG VAN EEN ELEKTRISCHE SCHOK, MECHANISCHE OF ANDERE GEVAREN.**

BRĪDINĀJUMS (LV)

- **ŠĪ APKALPES ROKASGRĀMATA IR PIEEJAMA TIKAI ANGĻU VALODĀ.**
- **JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANGĻU, KLIENTA PIENĀKUMS IR NODROŠINĀT TULKOŠANU.**
- **NEVEICIET APRĪKOJUMA APKALPI BEZ APKALPES ROKASGRĀMATAS IZLASĪŠANAS UN SAPRAŠANAS.**
- **ŠĪ BRĪDINĀJUMA NEIEVĒROŠANA VAR RADĪT ELEKTRISKĀS STRĀVAS TRIECIENA, MEHĀNISKU VAI CITU RISKU IZRAISĪTU TRAUMU APKALPES SNIEDZĒJAM, OPERATORAM VAI PACIENTAM.**

ĮSPĖJIMAS (LT)

- **ŠIS EKSPLOATAVIMO VADOVAS YRA IŠLEISTAS TIK ANGLŲ KALBA.**
- **JEI KLIENTO PASLAUGŲ TEIKĖJUI REIKIA VADOVO KITA KALBA – NE ANGLŲ, VERTIMU PASIRŪPINTI TURI KLIENTAS.**
- **NEMĖGINKITE ATLIKTI ĮRANGOS TECHNINĖS PRIEŽIŪROS DARBŲ, NEBENT VADOVAUTUMĖTĖS ŠIUO EKSPLOATAVIMO VADOVU IR JĮ SUPRASTUMĖTE**
- **NEPAISANT ŠIO PERSPĖJIMO, PASLAUGŲ TEIKĖJAS, OPERATORIUS AR PACIENTAS GALI BŪTI SUŽEISTAS DĖL ELEKTROS SMŪGIO, MECHANINIŲ AR KITŲ PAVOJŲ.**

ADVARSEL (NO)

- **DENNE SERVICEHÅNDBOKEN FINNES BARE PÅ ENGELSK.**
- **HVIS KUNDENS SERVICELEVERANDØR TRENGER ET ANNET SPRÅK, ER DET KUNDENS ANSVAR Å SØRGE FOR OVERSETTELSE.**
- **IKKE FORSØK Å REPARERE UTSTYRET UTEN AT DENNE SERVICEHÅNDBOKEN ER LEST OG FORSTÅTT.**
- **MANGLENDE HENSYN TIL DENNE ADVARSELEN KAN FØRE TIL AT SERVICELEVERANDØREN, OPERATØREN ELLER PASIENTEN SKADES PÅ GRUNN AV ELEKTRISK STØT, MEKANISKE ELLER ANDRE FARER.**

OSTRZEŻENIE (PL)

- **NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIE W JĘZYKU ANGIELSKIM.**
- **JEŚLI FIRMA ŚWIADCZĄCA KLIENTOWI USŁUGI SERWISOWE WYMAGA UDOSTĘPNIENIA PODRĘCZNIKA W JĘZYKU INNYM NIŻ ANGIELSKI, OBOWIĄZEK ZAPEWNIENIA STOSOWNEGO TŁUMACZENIA SPOCZYWA NA KLIENCIE.**
- **NIE PRÓBOWAĆ SERWISOWAĆ NINIEJSZEGO SPRZĘTU BEZ UPRZEDNIEGO ZAPOZNANIA SIĘ Z PODRĘCZNIKIEM SERWISOWYM.**
- **NIEZASTOSOWANIE SIĘ DO TEGO OSTRZEŻENIA MOżE GROZIĆ OBRAŻENIAMI CIAŁA SERWISANTA, OPERATORA LUB PACJENTA W WYNIKU PORAŻENIA PRĄDEM, URAZU MECHANICZNEGO LUB INNEGO RODZAJU ZAGROŻEŃ.**

ATENȚIE (RO)

- **ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.**
- **DACĂ UN FURNIZOR DE SERVICII PENTRU CLIENȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENTULUI SĂ FURNIZEZE O TRADUCERE.**
- **NU ÎNCERCAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ŞI ÎNȚELEGERII ACESTUI MANUAL DE SERVICE.**
- **IGNORAREA ACESTUI AVERTISMENT AR PUTEA DUCE LA RĂNIREA DEPANATORULUI, OPERATORULUI SAU PACIENTULUI ÎN URMA PERICOLELOR DE ELECTROCUTARE, MECANICE SAU DE ALTĂ NATURĂ.**

ОСТОРОЖНО! (RU)

- **ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮ ПРЕДОСТАВЛЯЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.**
- **ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.**
- **ПЕРЕД ОБСЛУЖИВАНИЕМ ОБОРУДОВАНИЯ ОБЯЗАТЕЛЬНО ОБРАТИТЕСЬ К ДАННОМУ РУКОВОДСТВУ И ПОЙМИТЕ ИЗЛОЖЕННЫЕ В НЕМ СВЕДЕНИЯ.**
- **НЕСОБЛЮДЕНИЕ УКАЗАННЫХ ТРЕБОВАНИЙ МОЖЕТ ПРИВЕСТИ К ТОМУ, ЧТО СПЕЦИАЛИСТ ПО ТЕХОБСЛУЖИВАНИЮ, ОПЕРАТОР ИЛИ ПАЦИЕНТ ПОЛУЧАТ УДАР ЭЛЕКТРИЧЕСКИМ ТОКОМ, МЕХАНИЧЕСКУЮ ТРАВМУ ИЛИ ДРУГОЕ ПОВРЕЖДЕНИЕ.**

UPOZORNENIE (SK)

- **TÁTO SERVISNÁ PRÍRUČKA JE K DISPOZÍCII LEN V ANGLIČTINE.**
- **AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.**
- **NEPOKÚŠAJTE SA VYKONÁVAŤ SERVIS ZARIADENIA SKÔR, AKO SI NEPREČÍTATE SERVISNÚ PRÍRUČKU A NEPOROZUMIETE JEJ.**
- **ZANEDBANIE TOHTO UPOZORNENIA MÔŽE VYÚSTIŤ DO ZRANENIA POSKYTOVATEĽA SLUŽIEB, OBSLUHUJÚCEJ OSOBY ALEBO PACIENTA ELEKTRICKÝM PRÚDOM, PRÍPADNE DO MECHANICKÉHO ALEBO INÉHO NEBEZPEČENSTVA.**

VARNING (SV)

- **DEN HÄR SERVICEHANDBOKEN FINNS BARA TILLGÄNGLIG PÅ ENGELSKA.**
- **OM EN KUNDS SERVICETEKNIKER HAR BEHOV AV ETT ANNAT SPRÅK ÄN ENGELSKA ANSVARAR KUNDEN FÖR ATT TILLHANDAHÅLLA ÖVERSÄTTNINGSTJÄNSTER.**
- **FÖRSÖK INTE UTFÖRA SERVICE PÅ UTRUSTNINGEN OM DU INTE HAR LÄST OCH FÖRSTÅR DEN HÄR SERVICEHANDBOKEN.**
- **OM DU INTE TAR HÄNSYN TILL DEN HÄR VARNINGEN KAN DET RESULTERA I SKADOR PÅ SERVICETEKNIKERN, OPERATÖREN ELLER PATIENTEN TILL FÖLJD AV ELEKTRISKA STÖTAR, MEKANISKA FAROR ELLER ANDRA FAROR.**

DİKKAT (TR)

- **BU SERVİS KILAVUZU YALNIZCA İNGİLİZCE OLARAK SAĞLANMIŞTIR.**
- **EĞER MÜŞTERİ TEKNİSYENİ KILAVUZUN İNGİLİZCE DIŞINDAKİ BİR DİLDE OLMASINI İSTERSE, KILAVUZU TERCÜME ETTİRMEK MÜŞTERİNİN SORUMLULUĞUNDADIR.**
- **SERVİS KILAVUZUNU OKUYUP ANLAMADAN EKİPMANLARA MÜDAHALE ETMEYİNİZ.**
- **BU UYARININ GÖZ ARDI EDİLMESİ, ELEKTRİK ÇARPMASI YA DA MEKANİK VEYA DİĞER TÜRDEN KAZALAR SONUCUNDA TEKNİSYENİN, OPERATÖRÜN YA DA HASTANIN YARALANMASINA YOL AÇABİLİR.**

警告
(JA)

このサービスマニュアルには英語版しかありません。
GEHC 以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。
このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないで下さい。
この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

注意:
(ZH-CN)

本维修手册仅存有英文本。
非 GEHC 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。
未详细阅读和完全了解本手册之前，不得进行维修。
忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

경고
(KO)

- 본 서비스 지침서는 영어로만 이용하실 수 있습니다.
- 고객의 서비스 제공자가 영어이외 언어를 요구할 경우, 번역 서비스 지침서를 제공하는 것은 고객의 책임입니다.
- 본 서비스 지침서를 지참했고 이해하지 않는 한은 해당 장비를 수리를 시도하지 마십시오.
- 이 경우에 유해하지 않은 전기쇼크, 기계상의 혹은 다른 위험으로부터 서비스 제공자, 운영자 혹은 환자에게 위험을 가할 수 있습니다.

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT - FOR USA ONLY

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Healthcare personnel. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE’s electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE’s field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

OMISSIONS & ERRORS

If there are any omissions, errors or suggestions for improving this documentation, please contact the GE Healthcare Global Documentation Group with specific information listing the system type, manual title, part number, revision number, page number and suggestion details. Mail the information to: Service Documentation, 9900 Innovation Drive (RP-2123), Wauwatosa, WI 53226, USA.

GE Healthcare employees should use the iTrak System to report all documentation errors or omissions.

SERVICE SAFETY CONSIDERATIONS

DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

WARNING ***Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.***

For a complete review of all safety requirements, see the Safety Considerations section in Chapter 1.

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Revision	Date	Reason for change
1	17. SEP. 2008	Initial Release.
2	04. DEC. 2008	Updated part numbers plus text editing and additional replacement procedures. Removed unnecessary references to the phantom.
3	30 APR 2009	BT10 updates. Chapter 9 restructured
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Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing the Vivid-i™ and Vivid-q™ portable ultrasound scanner. The service provider must read and understand all the information presented here before installing or servicing a unit.

Table 1-1 Contents in Chapter 1

Section	Description	Page Number
1-1	Overview	1-1
1-2	Important Conventions	1-4
1-4	Product Labels and Icons	1-10
1-3	Safety Considerations	1-6
1-5	EMC, EMI, and ESD	1-17
1-6	Customer Assistance	1-19

1-1-2 Purpose of Service Manual

This manual provides installation and service information for the Vivid-i™ and Vivid-q™ portable ultrasound scanner, and contains the following chapters:

- *Chapter 1 - Introduction:*
  Contains a content summary and warnings.
- *Chapter 2 - Pre-Installation*
  Contains pre-installation requirements for the Vivid-i™ and Vivid-q™ portable ultrasound scanner.
- *Chapter 3 - Installation*
  Contains installation procedures and an installation checklist.
- *Chapter 4 - Functional Checks*
  Contains functional checks that are recommended as part of the installation procedure, or as required during servicing and periodic maintenance.
- *Chapter 5 - Components and Function (Theory)*
  Contains block diagrams and functional explanations of the electronic circuits.
- *Chapter 6 - Service Adjustments*
  Contains instructions for performing service adjustments to the Vivid-i™ and Vivid-q™ portable ultrasound scanner.
- *Chapter 7 - Diagnostics/Troubleshooting*
  Provides instructions for setting up and running diagnostic, troubleshooting and other related routines for the Vivid-i™ and Vivid-q™ portable ultrasound scanner.

- *Chapter 8 - Replacement Procedures*
  Provides disassembly and reassembly procedures for all Field Replaceable Units (FRUs).
- *Chapter 9 - Renewal Parts*
  Contains a complete list of field replaceable parts for the Vivid-i™ and Vivid-q™ portable ultrasound scanner.
- *Chapter 10 - Care and Maintenance*
  Provides periodic maintenance procedures for the Vivid-i™ and Vivid-q™ portable ultrasound scanner.

1-1-3 Typical Users of the Basic Service Manual

This manual is intended for the following categories of users:

- GE service personnel (installation, maintenance, etc.).
- Hospital service personnel.
- Contractors (some parts of *Chapter 2 - Pre-Installation*).

1-1-4 Vivid-i™ Models Covered in this Manual

The Vivid-i™ models documented in this manual is shown in Table 1-2 below.

Table 1-2 Vivid-i™ Models

Model	Cat No.	Description	Comments
R2425000	H45021WP	Vivid-i™ portable ultrasound scanner - BT09 system	Must have *Cardiac*, *Vascular*, or *Cardiovascular* application module
R2425000	H45021WW	Vivid-i™ portable ultrasound scanner - BT09 cardiac system	Includes *Cardiac* application module

1-1-5 Vivid-q™ Models Covered in this Manual

The Vivid-q™ models documented in this manual is shown in Table 1-4 below.

Table 1-4 Vivid-q™ Models

Model	Cat No.	Description	Comments
R2424000	H45021WZ	Vivid-q™ portable ultrasound scanner - BT09 system	Must have *Cardiac*, *Vascular*, or *Cardiovascular* application module
R2424000	H45021YC	Vivid-q™ portable ultrasound scanner - BT09 cardiac system	Includes *Cardiac* application module

1-1-6 System History - Hardware and Software Versions

The Vivid-i™ is a compact, fully portable, phased, linear array ultrasound imaging scanner. Weighing only 5 Kgs (11 lbs), this laptop-style system is extremely versatile and, depending upon the installed software, can be used for a variety of applications.

The Vivid-q™ ultrasound imaging scanner is similar to the Vivid-i™ - however, newly designed to offer additional features including the ability to support use of M4S-RS probes. Also weighing only 5 Kgs (11 lbs), this laptop-style system is extremely versatile and, depending upon the installed software, can be used for a variety of applications.

The Vivid-i™/Vivid-q™ portable ultrasound scanner is based on parallel products in the Vivid™ family (Vivid™ 3, Vivid™ 4, Vivid™ S5, Vivid™ S6, and Vivid™ 7). Using the same advanced technology, the innovative features and versatility of the system represent the future of ultrasound scanning.

Note: Upgrade options may be available with future versions.

1-1-7 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the Vivid-i™ or Vivid-q™ system, and also kept near the unit for quick reference.

Section 1-2
Important Conventions

1-2-1 Conventions Used in this Manual

1-2-1-1 Model Designations

This manual covers the Vivid-i™ and Vivid-q™ ultrasound units listed in Table 1-2 on page 1-2.

1-2-1-2 Icons

Pictures, or icons, are used wherever they will reinforce the printed message. The icons, labels and conventions used on the product and in the service information are described in this chapter.

1-2-1-3 Safety Precaution Messages

Various levels of safety precautions are found on the equipment and throughout this service manual. Different levels of severity are identified by one of the following icons which precede precautionary statements in the text.

DANGER: Indicates the presence of a hazard that will cause severe personal injury or death if the instructions are ignored.

WARNING: Indicates the presence of a hazard that can cause severe personal injury and property damage if the instructions are ignored.

CAUTION: Indicates the presence of a hazard that can cause property damage but has absolutely no personal injury risk.

Note: Notes are used to provide important information about an item or a procedure. Be sure to read the notes as the information they contain can often save you time or effort.

1-2-1-4 Standard Hazard Icons

Important information will always be preceded by the exclamation point contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could cause harm.

Table 1-6 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION

LASER	HEAT	PINCH

Other hazard icons make you aware of specific procedures that should be followed.

Table 1-7 Standard Icons Indicating a Special Procedure Be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION

Section 1-3
Safety Considerations

1-3-1 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

1-3-2 Human Safety

Operating personnel must not remove the system covers.
Servicing should be performed by authorized personnel only.
Only personnel who have participated in Vivid-i™/ Vivid-q™ Training are authorized to service the equipment.

United States law restricts this device for sale or use by or on the order of a physician.

1-3-3 Mechanical Safety

DANGER: WHEN THE VIVID-I™ OR VIVID-Q™ SCANNER IS USED WITH THE SAFELOCK CART, MAKE SURE THE UNIT IS FIRMLY SECURED IN THE CORRECT POSITION ON THE CART SINCE IT MAY BECOME UNSTABLE AND TIP OVER.

DANGER: WHENENVER THE SAFELOCK CART IS TO BE MOVED ALONG ANY INCLINE, USE EXTREME CAUTION. MAKE SURE THAT THE VIVID-I™ OR VIVID-Q™ SCANNER AND ALL PERIPHERALS ARE SECURELY MOUNTED ON THE CART BEFORE ATTEMPTING TO MOVE IT.

DANGER: ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.

DANGER: NEVER USE A PROBE THAT HAS BEEN SUBJECTED TO MECHANICAL SHOCK OR IMPACT. EVEN IF THE PROBE APPEARS TO BE UNBROKEN, IT MAY IN FACT BE DAMAGED.

CAUTION: The Vivid-i™ and Vivid-q™ portable ultrasound scanner weighs 5kg (11 lbs.) or more, depending on carry-on peripherals when ready for use. In addition, the SafeLock cart weighs approximately 40kg (88 lbs.), excluding peripherals. Care must be used when moving the unit or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.

ALWAYS:

Use the handle to move the system

Be sure the pathway is clear.

Use slow, careful motions.

Do not let the system strike walls or door frames.

Whenever the Vivid-i™ or Vivid-q™scanner is mounted on the SafeLock Cart and being moved on inclines, make sure that the scanner and all peripherals are securely mounted on the SafeLock cart before attempting to move it.

WARNING: Always lock the SafeLock cart in its parked (locked) position after moving the system. Failure to do so could result in personal injury or equipment damage.

WARNING: Equipment damage could result if special care is not taken when transporting the Vivid-i™ or Vivid-q™ system (and SafeLock cart if applicable) in a vehicle.

ALWAYS:

- **Eject any disks from the MOD (if installed).**
- **Ensure that the Vivid-i™ or Vivid-q™ system is well prepared and packed in its original packaging before transporting. Special care must be taken to correctly position the packing material.**
  For further information, refer to *Chapter 3 - Installation*.
- **Place the probes in their carrying case.**
- **Secure the SafeLock cart in an upright position and lock the wheels (brake).**
- **Ensure that the Vivid-i™ or Vivid-q™ system (and SafeLock cart if applicable) is firmly secured while inside the vehicle.**
- **Secure the system with straps or as directed otherwise to prevent motion during transport.**
- **Prevent vibration damage by driving cautiously. Avoid unpaved roads, excessive speeds, and erratic stops or starts.**

1-3-4 Electrical Safety

To minimize shock hazard, the equipment must be connected to a well grounded power source. The system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety grounding.

To ensure proper grounding, connect this equipment to a receptacle marked "HOSPITAL ONLY" OR "HOSPITAL GRADE".

The power outlet used for this equipment should not be shared with other types of equipment. Both the system power cable and the power connector must meet international electrical standards.

1-3-4-1 Probes

All the probes for the Vivid-i™ and Vivid-q™ ultrasound unit are designed and manufactured to provide trouble-free, reliable service. To ensure this, correct handling of probes is important and the following points should be noted:

- Do not drop a probe or strike it against a hard surface, as this may damage the transducer elements, acoustic lens, or housing.
- Do not use a cracked or damaged probe. In this event, call your field service representative immediately to obtain a replacement.
- Avoid pulling, pinching or kinking the probe cable, since a damaged cable may compromise the electrical safety of the probe.
- To avoid the risk of a probe accidentally falling, do not allow the probe cables to become entangled, or to be caught in the machine's wheels.

NOTE: For detailed information on handling endocavity probes and invasive intracardiac probes, refer to the appropriate supplementary instructions for each probe. In addition, refer to the Vivid-i™/Vivid-q™ User Manual for detailed probe handling instructions.

1-3-5 Dangerous Procedure Warnings

Warnings, such as the warnings below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

EXPLOSION WARNING

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE.

OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

EQUIPMENT IS NOT SUITABLE FOR USE IN THE PRESENCE OF A FLAMMABLE ANAESTHETIC MIXTURE WITH AIR OR WITH OXYGEN OR NITROUS OXIDE.

DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT

BECAUSE OF THE DANGER OF INTRODUCING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

Section 1-4
Product Labels and Icons

The Vivid-i™ and Vivid-q™ portable ultrasound scanner comes equipped with product labels and icons. These labels and icons represent pertinent information regarding the operation of the unit.

1-4-1 Product Label Locations

The following diagrams show the label and icons found on the Vivid-i™ and Vivid-q™ultrasound unit. All the labels and icons are described in Table 1-8 on page 1-11.

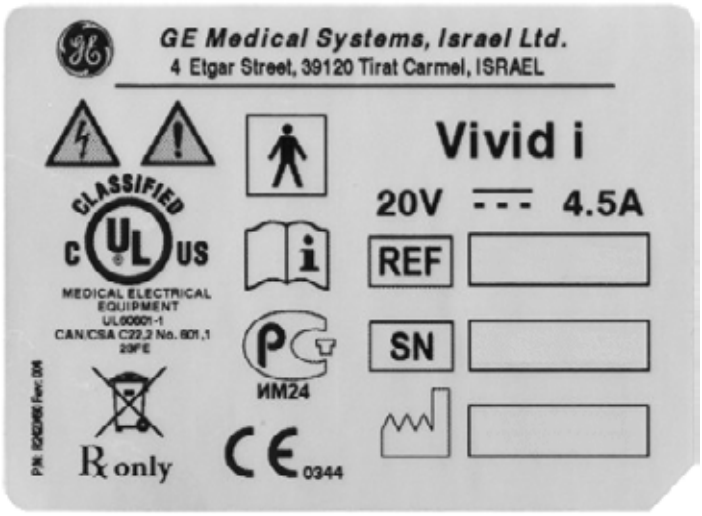


Figure 1-1 Main Label for Vivid-i™

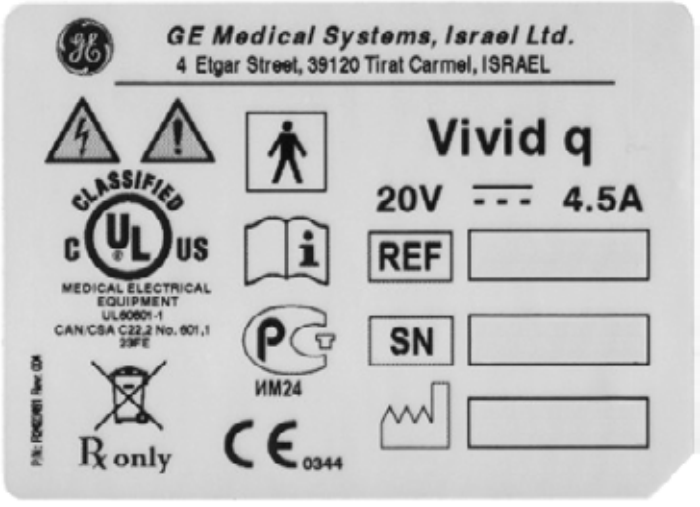


Figure 1-2 Main Label for Vivid-q™

1-4-2 Label Descriptions

The following table shows the labels and symbols that may be found on the Vivid-i™ and Vivid-q™ ultrasound unit, and provides a description of each label's purpose and location.

Table 1-8 Product Icons

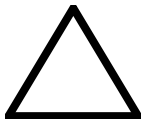
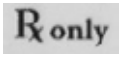
Label Name	Description	Location
Identification and Rating Plate	Manufacturer's name and location. Date of Manufacture. Model and Serial numbers. Electrical ratings (Volts and Amps)	On the base of the unit
Type/Class Label	Used to indicate the degree of safety or protection.	Bottom panel of the adapter
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	Various.
	"ATTENTION - Consult accompanying documents" is intended to alert the user to refer to the User Manual or other instructions when complete information cannot be provided on the label.	Various.
	"CAUTION - Dangerous voltage" (the lightning flash with arrowhead in equilateral triangle) is used to indicate electric shock hazards.	Various.
Device Listing/Certification Labels	Laboratory logos or labels that denote conformity with industry safety standards, such as UL or IEC.	On the base of the unit
	Indicates Equipment Type BF applied part for medical equipment. Identifies a BF type applied part complying with IEC 60601-1.	Probe connectors. On the base of the unit
	CE certification mark.	On the base of the unit
	Equipment Type CF IEC 60601-1 indicates equipment having a floating applied part that provides a degree of protection suitable for direct cardiac contact.	Above the ECG inlet, ECG connector and surgical probes.
	Indicates compliance with UL safety standard UL 60601-1 Medical Electrical Equipment, Part 1 General Requirements for Safety.	On the base of the unit

Table 1-8 Product Icons (cont'd)

Label Name	Description	Location
	Consult instructions for use.	On the base of the unit
	GOST-R mark - indicates compliance with Russian GOSSTANDART certification (Law of the Russian Federation No. 184-FZ).	On the base of the unit
	Waste Electrical and Electronic Equipment (WEEE) Disposal This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	On the base of the unit. On the rear of the SafeLock cart.
	Caution: Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.	On the base of the unit
CAUTION - This machine weighs...Special care must be used to avoid..." 	This precaution is intended to prevent injury that may be caused by the weight of the machine if one person attempts to move it considerable distances or on an incline.	Used in the Service and User Manual which should be adjacent to equipment at all times for quick reference.
"DANGER - Risk of explosion used in..."	The system is not designed for use with flammable anesthetic gases.	See EXPLOSION WARNING on page 1 - 9.
	"Protective Earth" Indicates the protective earth (grounding) terminal.	Rear of the SafeLock cart.
	"Equipotentiality" Indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.	Peripherals
	"ON" indicates the power ON position of the power switch. "Standby" indicates the power stand by position of the power switch. CAUTION This Power Switch DOES NOT ISOLATE Mains Supply.	Adjacent to ON/Standby Switch

1-4-3 Vivid-i™ and Vivid-q™ Battery Safety

The lithium ion battery provides power when an AC power source is not available. Lithium ion batteries last longer than conventional batteries and do not require replacement as often. You can expect one hour of battery life with a single, fully-charged battery.

The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such a watch batteries). Used batteries should not be placed with common household waste products. Contact local authorities for the location of a chemical waste collection program nearest you.

NOTE: Regulations vary for different countries. Dispose of a used battery in accordance with local regulations.

CAUTION: USE ONLY BATTERIES APPROVED BY GE MEDICAL SYSTEMS AS SUITABLE FOR USE WITH THE VIVID-I™ AND VIVID-Q™ PORTABLE ULTRASOUND SCANNER

WARNING: The Vivid-i™ and Vivid-q™ battery has a safety device.
***DO NOT ATTEMPT TO DIS-ASSEMBLE OR ALTER THE BATTERY*!**
Always observe the following precautions:

- Charge batteries only when the ambient temperature is between 0^{o} and 65^{o} C (32^{o} and 149^{o} F). and discharge the batteries between -10^{o} and 55^{o} C (14^{o} and 131^{o} F)
- Do not short-circuit the battery by directly connecting the negative terminals with metal objects.
- Do not heat the battery or discard it in a fire.
- Do not expose the battery to temperatures over 60^{o} C (140^{o} F). Keep the battery away from fire and other heat sources.
- Do not charge the battery near a heat source, such as, a fire or heater.
- Do not leave the battery in direct sunlight.
- Do not pierce the battery with a sharp object, hit it, or step on it.
- Do not use a damaged battery.
- Do not apply solder to a battery.
- Do not connect the battery to an electrical power outlet.

WARNING: In the event that the Vivid-i™ and Vivid-q™ portable ultrasound scanner will not be used for a long period, it is necessary to remove the battery from the system while not in use.

CAUTION: To prevent the battery bursting, igniting, or fumes from the battery causing equipment damage, always observe the following precautions:

- Do not immerse the battery in water or allow it to get wet.
- Do not place the battery into a microwave oven or pressurized container.
- If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, ***immediately remove it and stop using it***.
- If you have any questions about the battery, consult your local GE representative.
- Storage of the battery pack:

  Short term (less than 1 month): between 0^{o} C (32^{o} F) and 50^{o} C (122^{o} F).

  Long-term (more than 3 months): between 10^{o} C (50^{o} F) and 35^{o} C (95^{o} F)

Note: When storing a battery pack for more than 6 months, it is necessary to charge the battery pack at least once every 6 months in order to prevent leakage and deterioration in performance (as a result of self-discharging).

Note: When charging the battery for the first time after long-term storage, recover the battery pack to original performance through repeating several cycles of full charging and discharging.

NOTE: When shipped, the Vivid-i™ and Vivid-q™ battery is in a state of being approximately 30% charged. Before use, it is necessary to fully charge and discharge the battery pack up to 3 times, in order to utilize Li-Ion smart packs.

1-4-4 Vivid-i™ and Vivid-q™ External Labels

In addition to the labels described in the previous section, additional labels may be found on the Vivid-i™ or Vivid-q™ ultrasound unit, as described in the following sections:

- *Rating Labels* section, see below.
- *GND Label* section, see below.

1-4-4-1 Rating Labels

Indicates the ultrasound unit's basic power compliance and regulatory compliance information

The rating label shown below is located on the base assembly (underneath the ultrasound unit).

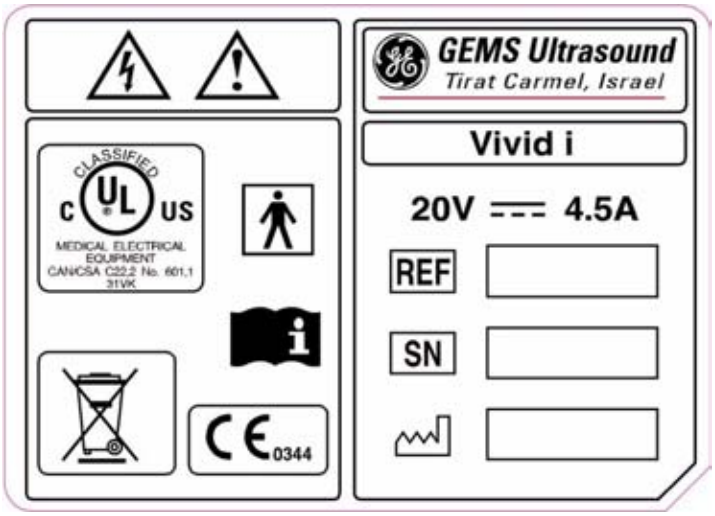


Figure 1-3 Vivid-i™ Rating Label

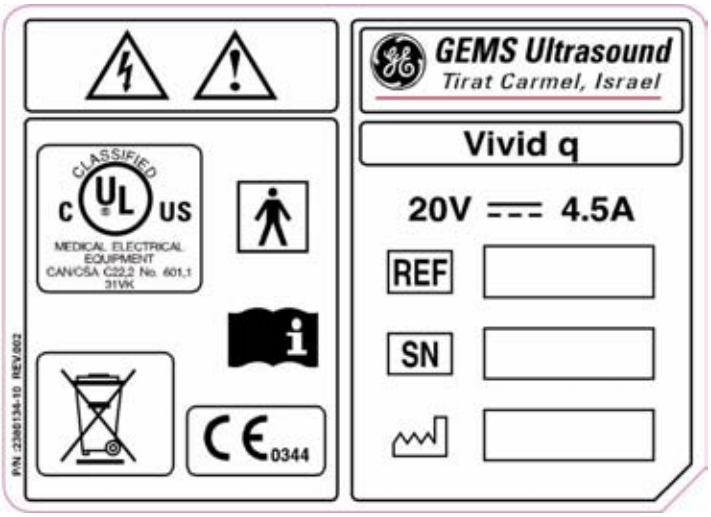


Figure 1-4 Vivid-q™ Rating Label

1-4-4-2 GND Label

Indicates the protective earth (grounding) terminal. The GND label (shown Figure 1-5 below) is located at the rear of the SafeLock cart.

Figure 1-5 GND Label

Section 1-5
EMC, EMI, and ESD

1-5-1 Electromagnetic Compatibility (EMC)

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings, including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due to interference from its environment, or when the device produces unacceptable levels of emission. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power or signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

IMPORTANT ***The Vivid-i™/ Vivid-q™ system and the SafeLock Cart should be operated at a distance of more than 15 feet from any magnetic field.***

1-5-2 CE Compliance

The Vivid-i™ and Vivid-q™ portable ultrasound scanner conforms to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

For applicable standards refer to the Safety Chapter in the Vivid-i™ and Vivid-q™ User Manual.

NOTE: For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh and clamps are in good condition and installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.

1-5-3 Electrostatic Discharge (ESD) Prevention

CAUTION: DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:

1.ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP CONNECTED TO THE BOTTOM COVER WHENEVER YOU OPEN THE SYSTEM FOR MAINTENANCE.

2.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

1-5-4 Standards Used

To fulfill the requirements of relevant EC directives and/or European Harmonized/International standards, the following documents/standards have been used:

Table 1-9 Standards Used

Scope	Standard/Directive
Product safety requirements for Electrical Medical devices Class I, Type B with BF and CF applied parts. (ICE catheter and ECG leads)	IEC 60601-1:1988+A1:1991+A2:1995
	EN 60601-1:1990+A1:1993+A2:1995+A13:1996
	UL 60601-1 (2003)
	C 22.2 601-1 M90 (R2005)
Product safety requirements for Electrical Medical devices-safety requirements for medical electrical systems	IEC 60601-1-1:2000 EN 60601-1-1:2001
Product safety requirements for Electrical Medical devices-Programmable electrical medical systems	IEC 60601-1-4:1996+A1:1999 EN 60601-1-4:1996+A1:1999
Product safety requirements for Ultrasound system	IEC 60601-2-37:2001+A1:2004+A2:2005 EN 60601-2-37: 2001+A1:2005 +A2:2005
Product EMC requirements Group 1. Class B	IEC 60601-1-2:2001+A1:2004 EN 60601-1-2:200+A1:2006
Biological evaluation of medical devices	ISO 10993-1:2003
Particular requirements for the safety of electrocardiograph monitoring equipment (Not for monitoring-only for synchronization with ultrasound)	IEC60601-2-27:1994 EN60601-2-27:1994
General requirements for basic safety and essential performance-Usability	IEC60601-1-6:2004 EN60601-1-6:2004
Patient privacy	HIPPA Safety.

NOTE: For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh and clamps are in good condition and installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.

1-5-5 Lockout/Tagout Requirements (For USA Only)

Follow OSHA Lockout/Tagout requirements to protect service personnel from injuries caused by unexpected energizing or start-up of equipment during service, repair, or maintenance.

Section 1-6
Customer Assistance

1-6-1 Contact Information

If this equipment does not work as indicated in this service manual or in the *Vivid-i™ and Vivid-q™ User Manual*, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

Prepare the following information before you call:

- System ID and/or serial number.
- Software version.

Table 1-10 Phone Numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Medical Systems Ultrasound Service Engineering 9900 Innovation Drive Wauwatosa, WI 53226	Service: On-site Service Parts Application Support	1-800-437-1171 1-800-558-2040 1-800-682-5327 or 1-262-524-5698
Canada		1-800-668-0732
Latin America	Service Application Support	1-800-321-7937 1-262-524-5698
Europe (OLC- EMEA) GE Ultraschall Deutschland GmbH Beethovenstraße 239 Postfach 11 05 60, D-42655 Solingen Germany	OLC - EMEA Phone: +49 (0)212 2802 - 652 +33 1 3083 1300 Fax: +49 (0) 212 2802 - 431	
Online Services Ultrasound Asia Australia China India Japan Korea Singapore	 Phone: +(61) 1-800-647-855 +(86) 800-810-8188 +(91) 1-800-11-4567 +(81) 42-648-2924 +(82) 2620 13585 +(95) 6277-3444	

Chapter 2
Pre-Installation

Section 2-1
Overview

2-1-1 Purpose of Chapter 2

This chapter provides the information required to plan and prepare for the installation of a Vivid-i™ or Vivid-q™ ultrasound unit. Included are descriptions of the electrical and facility requirements that must be met by the purchaser. A worksheet is provided at the end of this chapter (see Figure 2-2 on page 2-10) to help ensure that all the required network information is available, prior to installation.

Table 2-1 Contents in Chapter 2

Section	Description	Page Number
2-1	Overview	2-1
2-2	Console Requirements	2-2
2-3	Facility Needs	2-6

Section 2-2
Console Requirements

2-2-1 Unit Environmental Requirements

Table 2-2 Environmental Requirements

Requirement	Temperature	Relative Humidity (non-condensing)	Air Pressure
Operational	+10 — +40°C (50 — 104°F)	30 — 85%	700 — 1060 hPa
Storage	-10 — +60°C (14 — 140°F)	30 — 95%	700 — 1060 hPa
Transport	-10 — +60°C (14 — 140°F)	30 — 95%	700— 1060 hPa

CAUTION: If the system has been in storage or has been transported, please see the acclimation requirements *before* powering ON and/or using the system. Refer to the *Installation Warnings* section on page 3-2.

2-2-2 Cooling Requirements

The cooling requirement for the Vivid-i™ and Vivid-q™ ultrasound unit environment is 3500 BTU/hr. This figure does not include the cooling required for lights, people, or other equipment in the room.

Note: Each person in the room places an additional 300 BTU/hr demand on the environmental cooling.

2-2-3 Lighting Requirements

For system installation, updates and repairs, bright lighting is required. However, operator and patient comfort may be optimized if the room lighting is subdued and indirect when a scan is being performed. Therefore, a combination lighting system (dim/bright) is recommended. Keep in mind that lighting controls and dimmers can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interference.

2-2-4 Time and Manpower Requirements

Site preparation takes time. Begin pre-installation checks as soon as possible to allow sufficient time to make any required changes. If possible, begin these checks as many as six weeks before system delivery.

CAUTION: Only one person is required to unpack the Vivid-i™ or Vivid-q™ ultrasound unit; at least two people must be available to roll the system down the wheeling ramp. Attempts to move the system considerable distances (or on an incline) by one person alone, could result in personal injury, and/or damage to the system.

2-2-5 Electrical Requirements

NOTE: GE Medical Systems requires a dedicated mains power line and Ground for the proper operation of its Ultrasound equipment. This dedicated power line shall originate at the last distribution panel before the system.

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size Ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size Ground wire from the distribution panel to the Ultrasound outlet.

NOTE: Please note that image artifacts can occur, if at any time within the facility, the Ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

2-2-5-1 Vivid-i™/ Vivid-q™ Power Requirements

Electrical specifications for the Vivid-i™/ Vivid-q™ system are as follows:

Table 2-3 Electrical Requirements

Adaptor	Input Voltage	Output Voltage	Tolerances	Op. Current	Frequency
AC DC converter	100V AC to 240V AC	20V	±10%	0.5 to 1A	50-60 Hz

2-2-5-2 Inrush Current

Inrush current is not a factor for consideration, due to the inrush current limiting properties of the power supplies.

Table 2-4 Inrush Current

Voltage	Inrush Current	
	Console Only	Console with all Peripherals
100 V	4.5 A	9 A
240 V	2.3 A	4.5 A

2-2-5-3 Site Power Outlets

A dedicated AC power outlet must be within reach of the unit without requiring the use of extension cords. Other outlets adequate for the external peripherals, medical and test equipment required to support this unit must also be present and located within 1 m (3.2 ft) of the unit. Electrical installation must meet all current local, state, and national electrical codes.

2-2-5-4 Mains Power Plug

The Vivid-i™ and Vivid-q™ portable ultrasound scanner are supplied with a mains power plug, as standard. In the event that the unit arrives without a power plug, or with the wrong plug, contact your GE dealer. When necessary, the installation engineer will supply the appropriate power plug to meet the applicable local regulations.

2-2-5-5 Power Stability Requirements

- **Voltage drop-out**

Max 10 ms.

Note: Only relevant if system is operating without a battery/

- **Power Transients**

(All applications)

Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-6 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. They also generate EMI. The Vivid-i™ and Vivid-q™ ultrasound units comply with limits as stated on the EMC label. However, there is no guarantee that interference will not occur in a particular installation.

Note: Possible EMI sources should be identified before the unit is installed, and should not be on the same line as the ultrasound system. A dedicated line should be used for the ultrasound system.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. Sources of EMI include the following:

- Medical lasers.
- Scanners.
- Cauterizing guns.
- Computers.
- Monitors.
- Fans.
- Gel warmers.
- Microwave ovens.
- Portable phones.
- Broadcast stations and mobile broadcasting machines.

The following table lists recommendations for preventing EMI:

Table 2-5 EMI Prevention/ Abatement

EMI Rule	Details
Ground the unit.	Poor grounding is the most likely reason an ultrasound unit will have noisy images. Check the grounding of the power cord and power outlet.
Be aware of RF sources.	Keep the unit at least 5m (16.4 ft) away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Replace and/or reassemble all screws, RF gaskets, covers and cores.	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of the card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets.	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn ON the unit until any loose metallic part is removed and replaced, if required.
Do not place labels where RF gaskets touch metal.	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. In case a label has been found in such a location, move the label to a different, appropriate location.
Use GE-specified harnesses and peripherals.	The interconnect cables are grounded and require ferrite beads and other shielding. Cable length, material, and routing are all important; do not make any changes that do not meet all specifications.
Take care with cellular phones.	Cellular phones may transmit a 5 V/m signal that causes image artifacts.
Properly address peripheral cables.	Do not allow cables to lie across the top of the system. Loop any peripheral cable excess length into one bundle.

2-2-7 Probe Environmental Requirements

Table 2-6 Probe Operation and Storage Temperatures

	Electronics
Operation	10 — 40^{o}C (50 — 104^{o}F)
Storage	-20 — 50^{o}C (-4 — 122^{o}F)

Note: System and electronic probes are designed for storage temperatures of -20^{o} to +50^{o} C. When exposed to large temperature variations, the probes should be kept at room temperature for a *minimum* of ***10 hours*** before use.

Section 2-3
Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials required to prepare the site are the responsibility of the purchaser. To avoid delay, complete all pre-installation work before delivery. Use the Pre-installation Check List (provided in Table 2-7 on page 2-12) to verify that all the required steps have been completed.

Purchaser responsibilities include:

- Procuring the required materials.
- Completing the preparations prior to delivery of the ultrasound system.
- Paying the costs of any alterations and modifications not specifically provided for in the sales contract.

Note: All relevant preliminary electrical installations at the prepared site must be performed by licensed electrical contractors. Other connections between electrical equipment, and calibration and testing, must also be performed by qualified personnel. The products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these products must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must utilize only qualified personnel to perform electrical servicing of the equipment.

To avoid delays during installation, the individual or team who will perform the installation should be notified at the earliest possible date (preferably prior to installation), of the existence of any of the following variances:

- Use of any non-listed product(s).
- Use of any customer provided product(s).
- Placement of an approved product further from the system than the interface kit allows.

The prepared site must be clean prior to delivery of the system. Carpeting is not recommended because it collects dust and creates static. Potential sources of EMI should also be investigated before delivery. Dirt, static, and EMI can negatively impact system reliability.

2-3-2 Mandatory Site Requirements

The following are mandatory site requirements. Additional (optional) recommendations, as well as a recommended ultrasound room layout, are provided in section *2-3-3 - Site Recommendations* (see below).

- A dedicated single branch power outlet of adequate amperage (see Table 2-3 on page 2-3.) that meets all local and national codes and is located less than 2.5 m (8.2 ft) from the unit's proposed location. Refer to the *Electrical Requirements* section on page 2-3.
- A door opening of at least 76 cm (2.5 ft) in width (if using the SafeLock Cart).
- The proposed location for the unit is at least 0.2 m (0.67 ft) from the walls, to enable cooling.
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.
- Power outlets for other medical equipment and gel warmer.
- Power outlets for test equipment within 1 m (3.3 ft) of the ultrasound unit.
- Clean and protected space for storage of probes (either in their case or on a rack).
- Material to safely clean probes (performed using a plastic container, never metal).
- In the case of a network option:
  - An active network outlet in the vicinity of the ultrasound unit.
  - A network cable of appropriate length (regular Pin-to-Pin network cable).
  - An IT administrator who will assist in configuring the unit to work with your local network. A fixed IP address is required. Refer to the form provided in Figure 2-2 on page 2-10 for network details that are required.

Note: All relevant preliminary network outlets installations at the prepared site must be performed by authorized contractors. The purchaser of GE equipment must utilize only qualified personnel to perform servicing of the equipment.

2-3-3 Site Recommendations

The following are (optional) site recommendations. Mandatory site requirements are provided in the *Mandatory Site Requirements* section, above.

- Door opening of 92 cm (3 ft) in width (if using the SafeLock Cart).
- Accessible circuit breaker for a dedicated power outlet.
- Sink with hot and cold running water.
- Receptacle for bio–hazardous waste, for example, used probe sheaths.
- Emergency oxygen supply.
- Storage area for linens and equipment.
- Nearby waiting room, lavatory, and dressing room.
- Dual level lighting (bright and dim).
- Lockable cabinet for software and manuals.

2-3-3-1 Recommended Ultrasound Room Layout

Figure 2-1 below shows a floor plan illustrating the recommended layout of the Ultrasound Room and depicting the minimal room layout requirements.

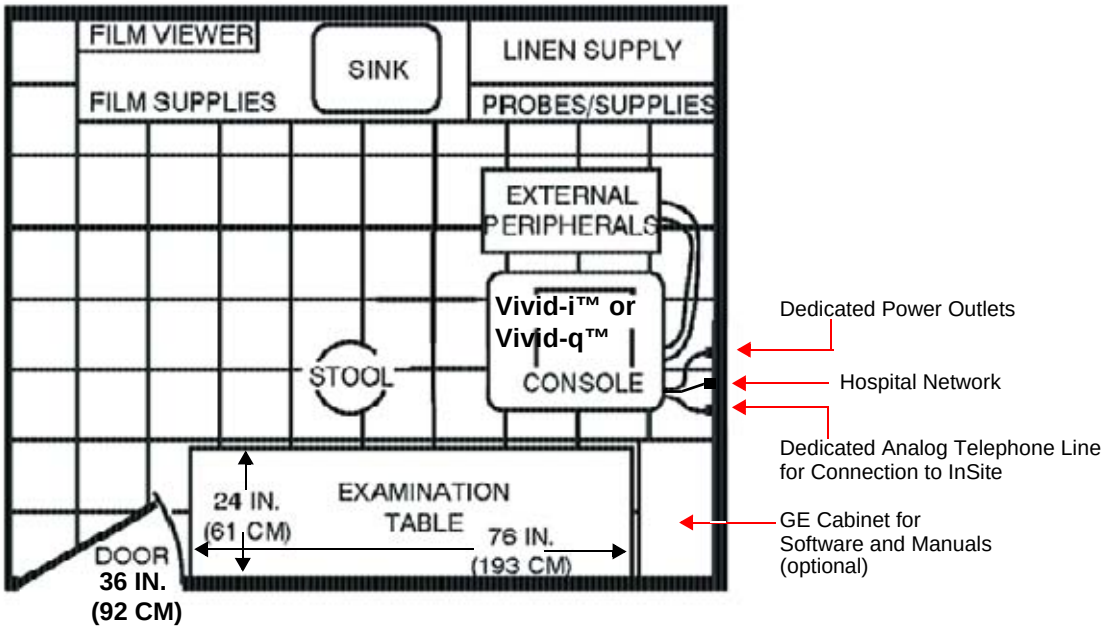


Figure 2-1 Recommended Floor Plan 4.3m x 5.2m (14 ft x 17 ft)

2-3-4 Networking Pre-Installation Requirements

2-3-4-1 Stand-alone Unit (without Network Connection)

None.

2-3-4-2 Unit Connected to Hospital's Network

Supported networks:

- Wired LAN
- Wireless LAN

2-3-4-3 Purpose of the DICOM Network Function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues. With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-4-4 DICOM Option Pre-Installation Requirements

To configure the Vivid-i™/ Vivid-q™ ultrasound unit to work with other network connections, the network administrator must provide the required information, which should include the following:

- **Vivid-i™/ Vivid-q™ Details**: DICOM network details for the Vivid-i™/ Vivid-q™ unit, including the host name, local port, IP address, AE title and net mask.
- **Routing Information**: IP addresses for the default gateway and other routers in use at the site.
- **DICOM Application Information**: Details of the DICOM devices in use at the site, including the DICOM host name, AE title and IP addresses.

Section 2-4
Connectivity Installation Worksheet

Site System Information

Site:

Dept:

Floor:

Room:

Comments:

Vivid-i™ SN:
(or Vivid-q™ SN:)

Type:

REV:

CONTACT INFORMATION

Name	Title	Phone	E-Mail Address

TCP/IP Settings

Scanner IP Settings

Name - AE Title:

IP Address:

Subnet Mask:

Default Gateway:

Remote Archive Setup
(Echo Server/GEMNet Server/EchoPac PC)

Name - AE Title:

IP Address:

Subnet Mask:

Default Gateway:

Server Name:

Remote DB User Name:

Services (Destination Devices)

	Device Type	Manufacturer	Name	IP Address	Port	AE Title
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Figure 2-2 Connectivity Installation Worksheet

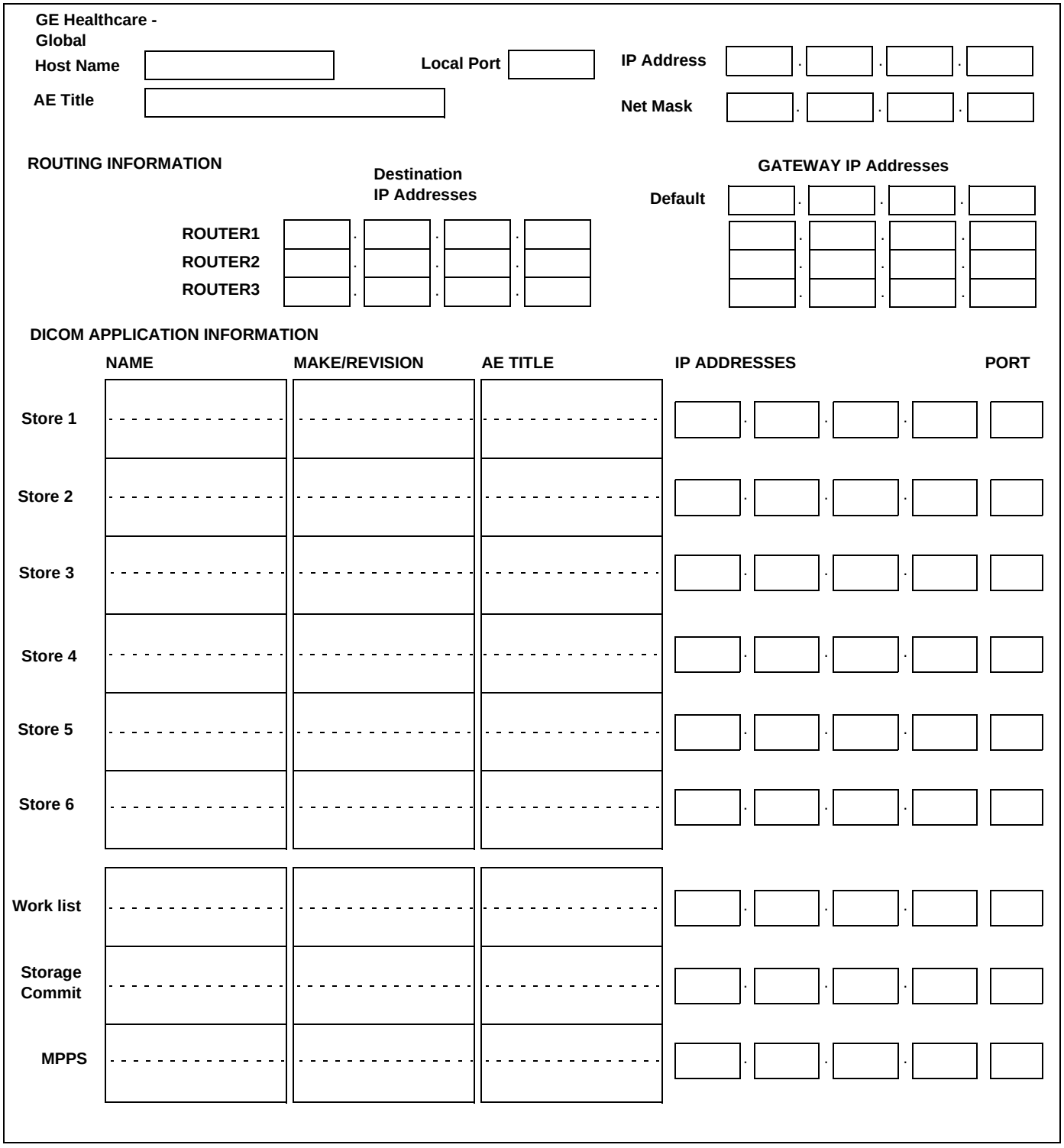


Figure 2-3 Worksheet for DICOM Network Information

Table 2-7 Vivid-i™/ Vivid-q™ Pre-Installation Check List

Action	Yes	No
Schedule at least 3 hours for installation of the system.		
Notify installation team of the existence of any variances from the basic installation.		
Make sure system and probes have been subject to acclimation period.		
Environmental cooling is sufficient.		
Lighting is adjustable to adapt to varying operational conditions of the scanner.		
Electrical facilities meet system requirements.		
EMI precautions have been taken and all possible sources of interference have been removed.		
Mandatory site requirements have been met.		
If a network is used, IP address has been set for the system and a dedicated network outlet is available.		

Chapter 3
Installation

Section 3-1
Overview

3-1-1 Purpose of Chapter 3

This chapter provides instructions for installing the Vivid-i™ and Vivid-q™ ultrasound unit. Before beginning the installation process, an appropriate site must be prepared, as described in *Chapter 2 - Pre-Installation*. Once the site has been prepared, installation can proceed as described in this chapter.

Included in this chapter are guidelines for transporting the unit to a new site, as well as procedures that describe how to receive and unpack the equipment, and (if necessary) how to file a damage or loss claim. Instructions for checking and testing the unit, probes, and external peripherals for electrical safety are also provided.

NOTE: Depending on the customer's specific requirements, the Vivid-i™/Vivid-q™ portable ultrasound scanner may have been supplied with or without the SafeLock Cart (optional). Where applicable, the installation procedures for each scenario are clearly identified in this chapter.

Table 3-1 Contents in Chapter 3

Section	Description	Page Number
3-1	Overview	3-1
3-2	Installation Reminders	3-1
3-3	Receiving and Unpacking the Equipment	3-3
3-4	Preparing for Installation	3-14
3-5	Completing the Hardware Installation	3-27
3-6	Mounting the Vivid-i™/ Vivid-q™ on the SafeLock Cart (optional)	3-71
3-7	Configuration	3-75
3-8	Connectivity Setup	3-92
3-9	Storing and Transporting the Unit	3-185
3-10	Completing the Installation Paperwork	3-186

Section 3-2
Installation Reminders

3-2-1 Average Installation Time

The Vivid-i™/ Vivid-q™ installation and functional checkout will take approximately one hour; Vivid-i™ or Vivid-q™consoles with optional equipment may take slightly longer.

Once the site has been prepared, the average installation time required is shown in Table 3-2 below.

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	20 minutes	
Installing the scanner	30 minutes	Time may vary, according to the required configuration
DICOM Option (connectivity)	30 minutes	Time may vary, according to the required configuration

3-2-2 Installation Warnings

1.) The Vivid-i™/Vivid-q™ portable ultrasound scanner weighs only 5 Kgs (11 lbs), without options. However since the SafeLock Cart weighs approximately 40 kg (88 lbs), two persons are always required to unpack it.

2.) There are no operator-serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

NOTE: For information on shipping carton labels, refer to Figure 3-1 on page 3-4 and Figure 3-5 on page 3-7.

3-2-2-1 System Acclimation Time

Following transport, the Vivid-i™/ Vivid-q™ system may be very cold, or hot. Allow time for the system to acclimate before being switched ON. Acclimation requires 1 hour for each 2.5°C increment, when the temperature of the system is below 10°C or above 35°C.

CAUTION Turning the system ON after arrival at the site - without allowing time for acclimation - may cause system damage!

Table 3-3 Vivid-i™/ Vivid-q™ System Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	96	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
Hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

3-2-3 Safety Reminders

DANGER: WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DO NOT TOUCH THE UNIT!

WARNING: Two people are required to unpack the SafeLock Cart, as it is heavy. Two people are always required whenever a part weighing 19kg (35 lb.) or more must be lifted.

CAUTION: If the unit is very cold or hot, do NOT turn ON power to the unit until it has had sufficient time to acclimate to its operating environment.

CAUTION: To prevent electrical shock, connect the unit to a properly grounded power outlet. Do NOT use a three-prong to two-prong adapter, as this defeats safety grounding.

CAUTION: To ensure proper grounding, connect this equipment to a receptacle marked "HOSPITAL ONLY" OR "HOSPITAL GRADE".

CAUTION: Do NOT wear the ESD wrist strap when you work on live circuits where more than 30 V peak is present.

CAUTION: Do NOT operate the unit unless all board covers and frame panels are securely in place, to ensure optimal system performance and cooling. (When covers are removed, EMI may be present).

WARNING: ACOUSTIC OUTPUT HAZARD
Although the ultrasound energy transmitted from the Vivid-i™/ Vivid-q™ is within AIUM/NEMA standards and FDA limitations, avoid unnecessary exposure. Ultrasound energy can produce heat and mechanical damage.

Important: When the SafeLock Cart is connected to the wall outlet and the main circuit breaker is in the ON position, the AC Box Fan is operated, even if the system is turned ON.

Note: The *Vivid-i™/Vivid-q™ User Manual* should be fully read and understood before operating the unit. Keep the manual near the unit for reference.

Section 3-3
Receiving and Unpacking the Equipment

CAUTION: Please read this section fully before unpacking the Vivid-i™ or Vivid-q™ ultrasound unit.

The Vivid-i™/ Vivid-q™ ultrasound unit, together with the optional SafeLock Cart (if ordered), peripherals, probes, cables, and accessories, are shipped from the factory in a single cardboard shipping carton mounted on a raised wooden base - see Figure 3-2 on page 3-5.

Where the specific customer requirements are for a Vivid-i™/ Vivid-q™ ultrasound unit with peripherals *only* (without SafeLock Cart), this is shipped in a smaller-sized cardboard shipping carton mounted on a raised wooden base - see Figure 3-3 on page 3-5.

Similarly, if a SafeLock Cart *only* has been ordered, this is shipped in a large-sized cardboard shipping carton mounted on a raised wooden base - see Figure 3-4 on page 3-6.

Unpacking instructions for each type of shipping carton are provided separately in the following sections:

- Unpacking the Vivid-i™/ Vivid-q™ with Peripherals and SafeLock Cart on page 3 - 7
- Unpacking the Vivid-i™/ Vivid-q™ with Peripherals on page 3 - 9
- Unpacking the Vivid-i™/ Vivid-q™ SafeLock Cart on page 3 - 10

NOTE: For details of weights and dimensions of all three shipping cartons, refer to Table 3-4 on page 3-6.

Each cardboard shipping carton is sealed with plastic tape and secured on the outside with plastic straps. The interior of the carton is fully lined with re-sealable water-proof wrapping to protect the

contents from external moisture; silica gel bags are also placed among the contents to absorb any condensation or moisture within the carton.

Before unpacking the unit

- Inspect the carton for visible damage.
- Inspect the *Drop and Tilt* indicators (on the Shock-watch and Tilt-watch labels, respectively) for evidence of accidental shock or tilting during transit (damage incident) - refer to Figure 3-1 below.

NOTICE After unpacking the unit:
It is recommended to keep and store the shipping carton and all other packing materials (including the support foams, anti-static plastic cover, etc.), in case the unit (and/or SafeLock Cart) has to be moved to a different location in the future.

For warranty purposes, storage of the above is required for one year from date of purchase.

Figure 3-1 Drop and Tilt Indicators

If the carton is damaged, or if either the Drop or Tilt indicators have turned red (indicating damage incident*), please inform the GE Medical Systems sales representative immediately. In addition, mark on the shipping consignment note or packing slip/post-delivery checklist (in the "Package" column) that the Tilt and/or Drop indicators show* damage incident.

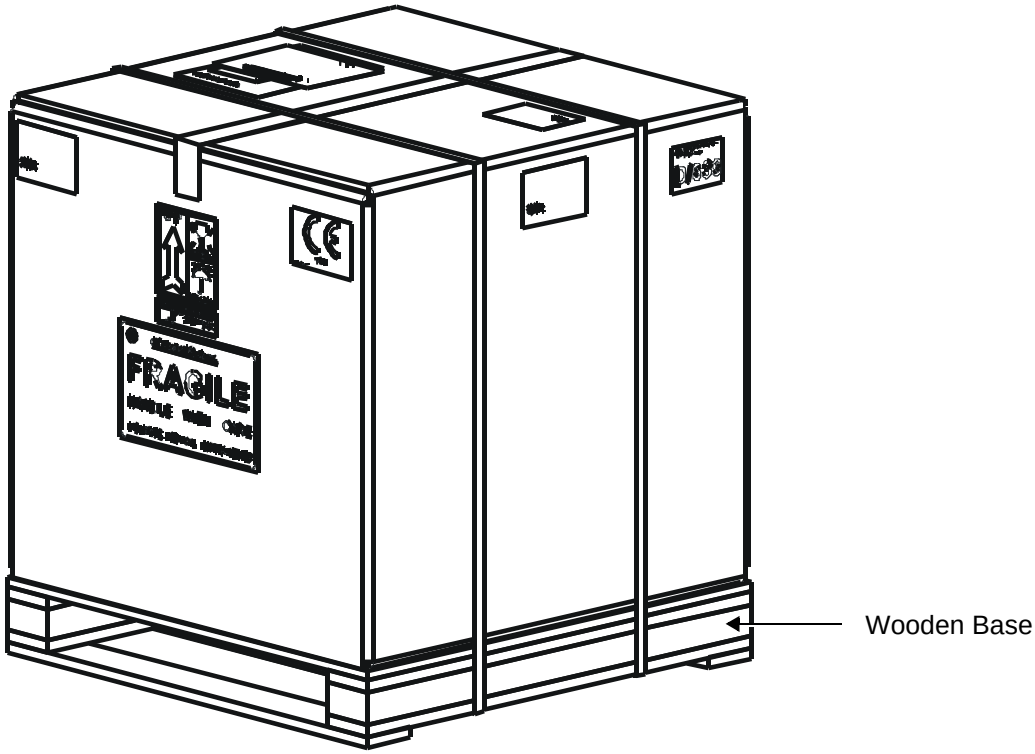


Figure 3-2 Shipping Carton - Vivid-i™/ Vivid-q™ with Peripherals and SafeLock Cart

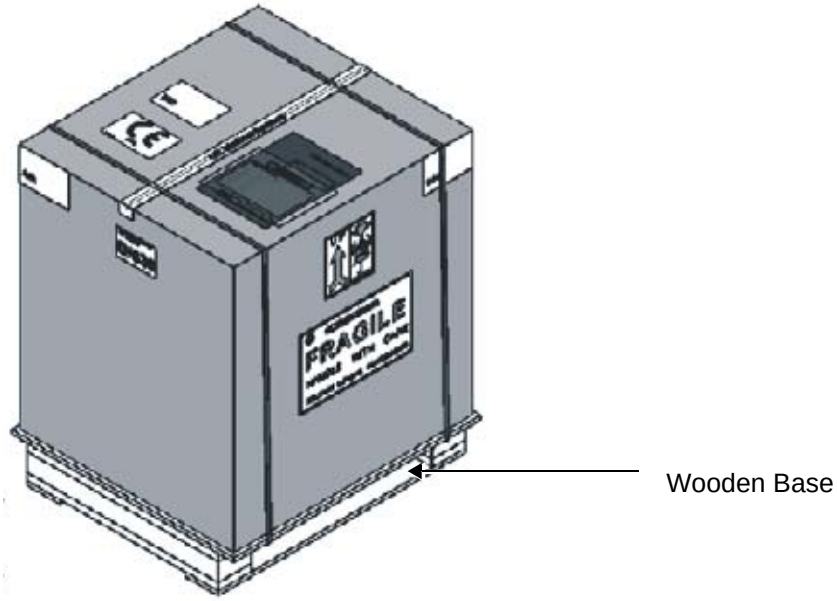


Figure 3-3 Shipping Carton - Vivid-i™/ Vivid-q™ with Peripherals Only

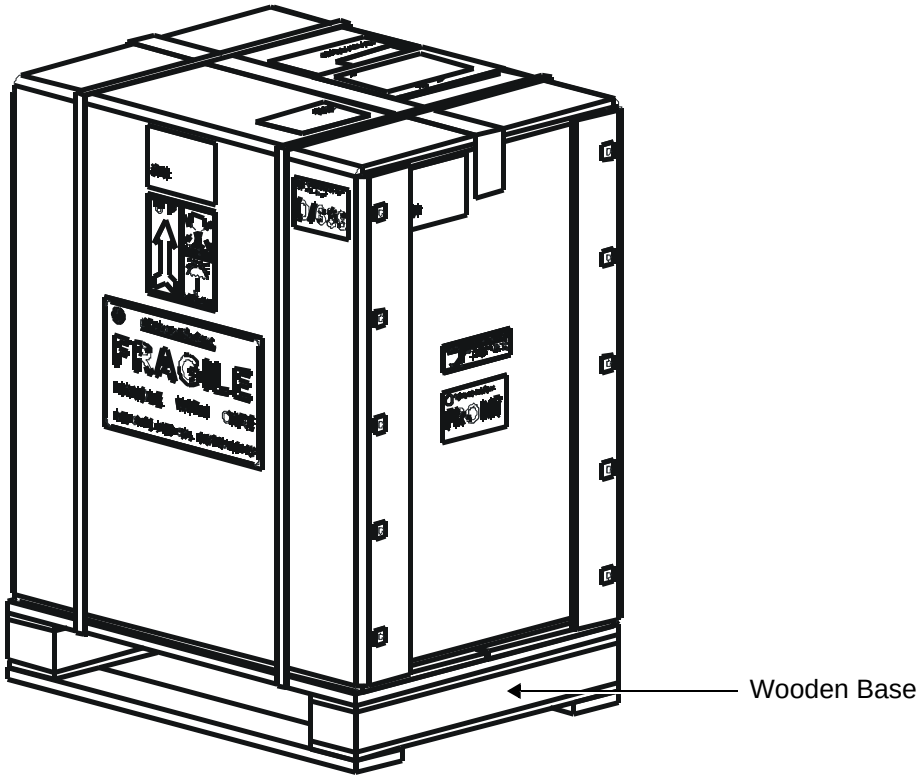


Figure 3-4 Shipping Carton - Vivid-i™/ Vivid-q™ SafeLock Cart Only

Table 3-4 Shipping Cartons - Dimensions and Weights

Description	Height	Width	Depth	Weight[a]
Vivid-i™/ Vivid-q™ scanner with SafeLock Cart (incl. peripherals and accessories)	160 cm 63 ins	100 cm 39 ins	100 cm 39 ins	100 kgs 220 lbs
Vivid-i™/ Vivid-q™ scanner - no SafeLock Cart (incl. peripherals and accessories)	50 cm 20 ins	100 cm 39 ins	100 cm 39 ins	60 kgs 132 lbs
Vivid-i™/ Vivid-q™ SafeLock Cart only	970 cm 382 ins	760 cm 299 ins	575 cm 226 ins	45 kgs 99 lbs

a. Weight is approximate and will vary depending upon the supplied peripherals

Figure 3-5 Additional Labels on Shipping Carton

3-3-1 Unpacking the Cardboard Shipping Carton

As previously described, the Vivid-i™ or Vivid-q™ ultrasound unit is packed in a single cardboard shipping carton comprising a durable outer cardboard carton cover and a wooden platform base; these are firmly joined together with steel straps. After completing a visual inspection of the shipping carton and *Drop/Tilt* indicators, proceed to the unpacking instructions below, as appropriate.

3-3-1-1 Unpacking the Vivid-i™/ Vivid-q™ with Peripherals and SafeLock Cart

1.) Cut the steel straps securing the shipping carton to the wooden base - see Figure 3-2 on page 3-5.

CAUTION: When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.

2.) Carefully cut the adhesive tape used to close the shipping carton lid, and open the carton from the top.

3.) Carefully cut the adhesive tape used to close the front side of the shipping carton, remove the five staples from each side, then drop the side *downwards* until it is resting on the floor, as shown in Figure 3-6 below.

Note: The front side of the carton is re-inforced with wooden guide rails and, when dropped down in the open position, forms a strong ramp used for wheeling out the SafeLock Cart.

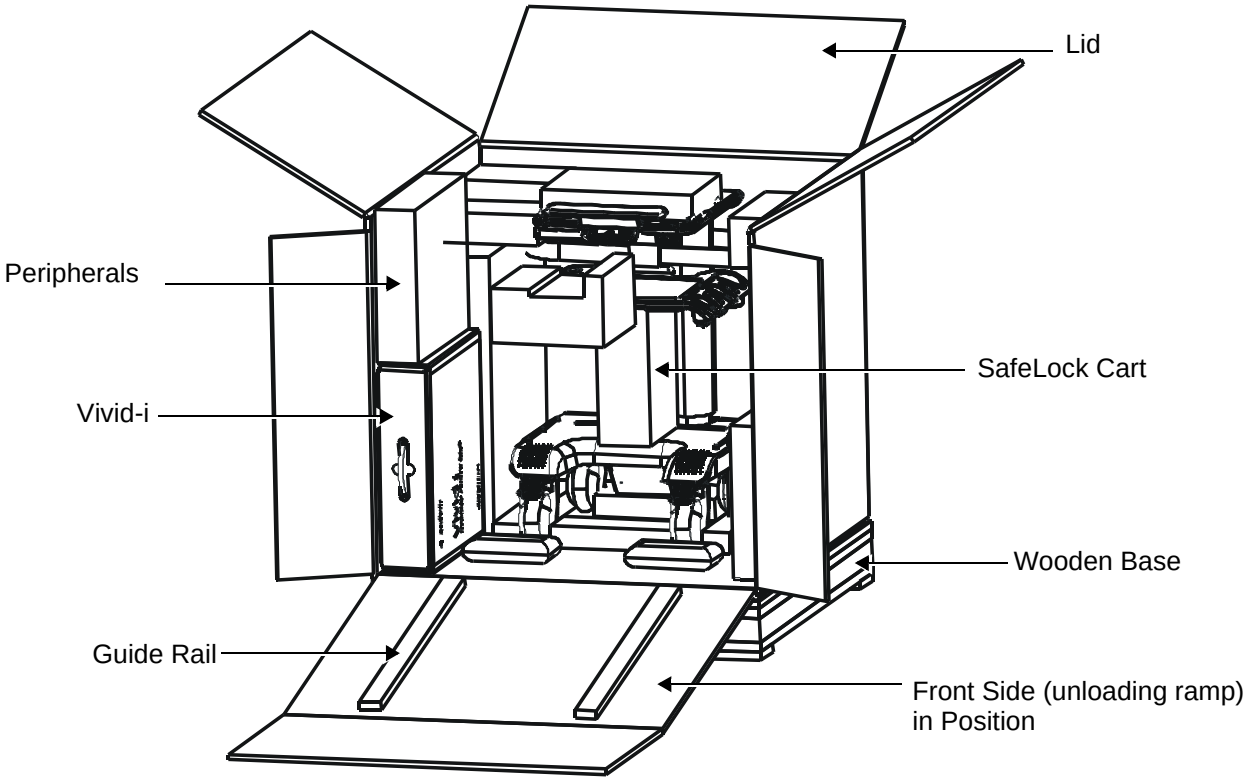


Figure 3-6 Shipping Carton with Top Open and Ramp in Position

4.) Undo the re-sealable water-proof carton liner.

5.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand ready to mark the check list - refer to Verifying the Shipping Carton Contents on page 3 - 14.

6.) Remove the surface packing material (paper pads, bubble packs, foam sections, silica gel, *etc*.). Continue to remove additional packing material as applicable during the following procedure steps.

7.) Carefully remove the box containing the peripherals and probes, as well as the package containing the following accessories: cables (AD/DC; ECG; Network), Isolation Box, and software DVD/CD.

8.) Carefully remove the box containing the Vivid-i™/ Vivid-q™ scanner.

9.) Remove any additional packing material in front of and surrounding the SafeLock Cart. Using two people, carefully roll the Cart *forwards* down the unloading ramp to remove it completely from the shipping carton - see Figure 3-6 below.

CAUTION

Two people are required when moving the SafeLock Cart

This precaution is intended to prevent injury that may be caused by the weight of the machine if one person attempts to move the cart considerable distances or on an incline.

Make sure the Cart is standing firmly on the floor before applying the locking brake.

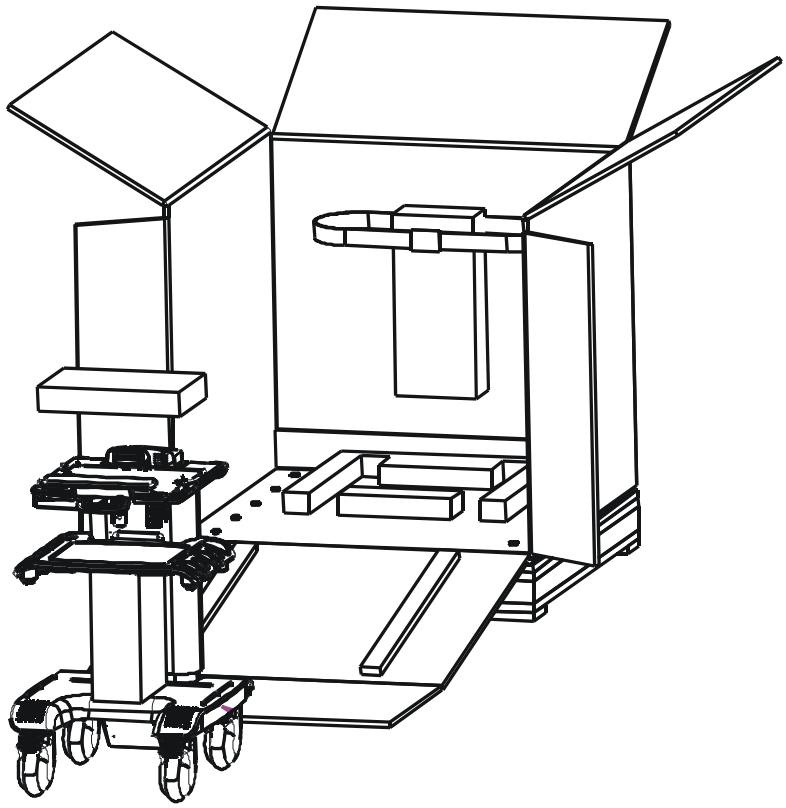


Figure 3-7 SafeLock Cart Removed from Shipping Carton

10.) Remove the foam sections from the top of the cart and from between the main shelf and probe shelf.

11.) Using the up/down handle, raise the main shelf up to appropriate height.

12.) Carefully remove the Vivid-i™/ Vivid-q™ ultrasound unit from its outer carton, and then remove the unit from the two protective interleavers (upper and lower).

13.) Before commencing the installation procedure, follow the instructions for Verifying the Shipping Carton Contents on page 3 - 13.

3-3-1-2 Unpacking the Vivid-i™/ Vivid-q™ with Peripherals

1.) Cut the steel straps securing the shipping carton to the wooden base - see Figure 3-3 on page 3-5.

CAUTION: When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.

2.) Carefully cut the adhesive tape used to close the shipping carton lid, and open the carton from the top - see Figure 3-8 below.

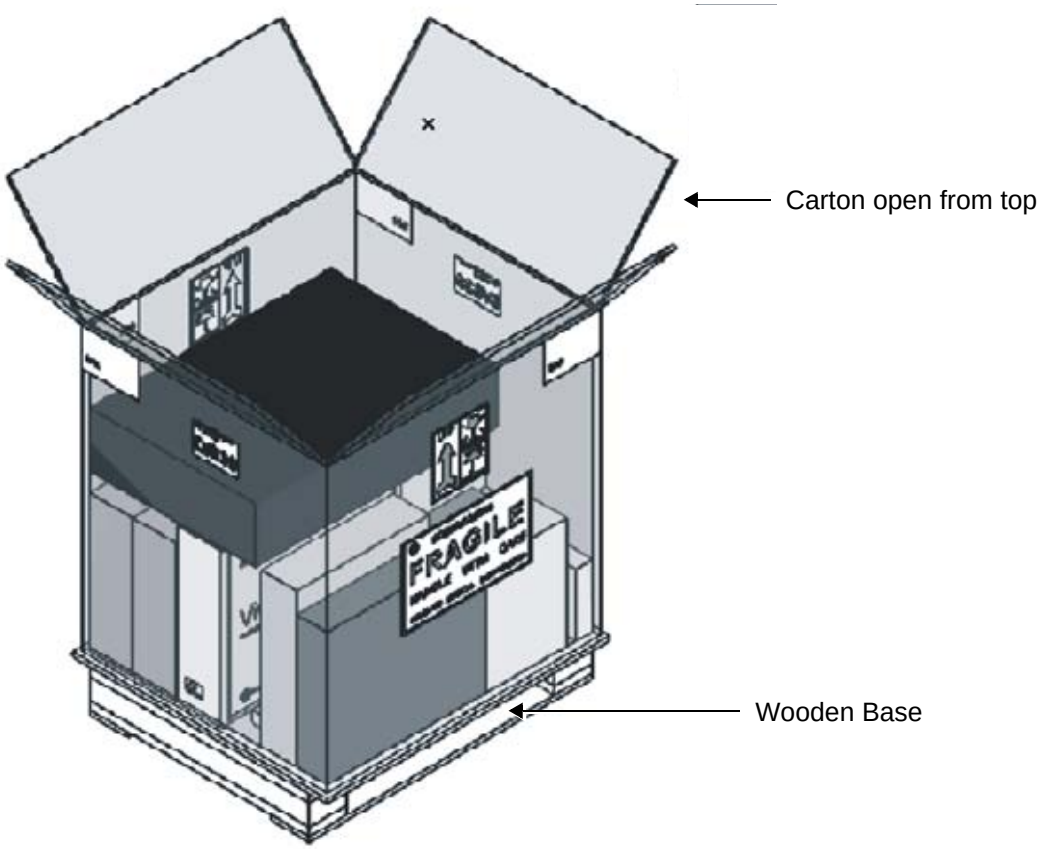


Figure 3-8 Vivid-i™/ Vivid-q™ with Peripherals - Carton Open

3.) Undo the re-sealable water-proof carton liner.

4.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand ready to mark the check list - refer to Verifying the Shipping Carton Contents on page 3 - 14.

5.) Remove the surface packing material (paper pads, bubble packs, foam sections, silica gel, *etc*.). Continue to remove additional packing material as applicable during the following procedure steps.

6.) Carefully remove the box containing the peripherals and probes

7.) Carefully remove the box containing the scanner.

8.) Carefully remove the Vivid-i™/ Vivid-q™ ultrasound unit from its outer carton, and then from the 2 protective interleavers (upper and lower).

9.) Before commencing the installation procedure, follow the instructions for Verifying the Shipping Carton Contents on page 3 - 13.

3-3-1-3 Unpacking the Vivid-i™/ Vivid-q™ SafeLock Cart

1.) Cut the steel straps securing the shipping carton to the wooden base - see Figure 3-2 on page 3-5.

CAUTION: When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.

2.) Carefully cut the adhesive tape used to close the shipping carton lid, and open the carton from the top.

3.) Carefully cut the adhesive tape used to close the front side of the shipping carton, remove the five staples from each side, then drop the side *downwards* until it is resting on the floor, as shown in Figure 3-9 below.

Note: The front side of the carton is re-inforced with wooden guide rails and, when dropped down in the open position, forms a strong ramp used for wheeling out the SafeLock Cart.

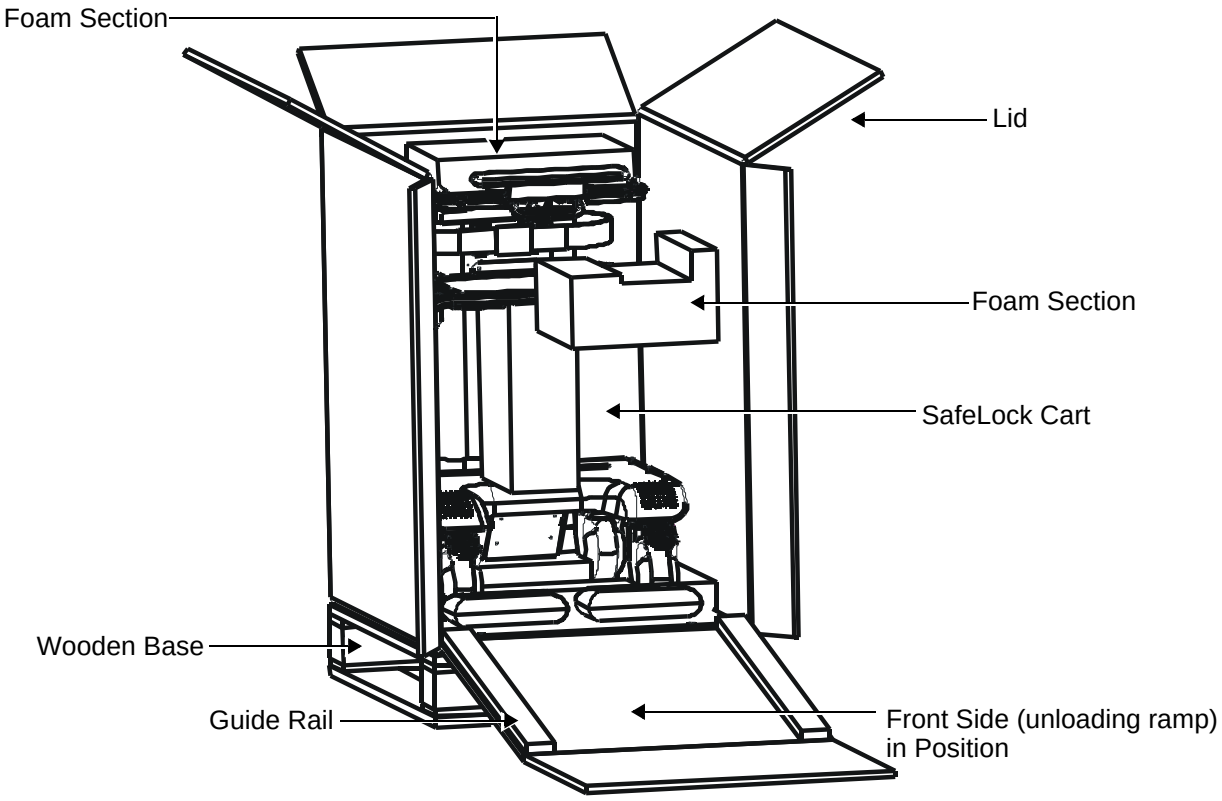


Figure 3-9 Shipping Carton with Top Open and Ramp in Position

4.) Undo the re-sealable water-proof carton liner.

5.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand ready to mark the check list - refer to Verifying the Shipping Carton Contents on page 3 - 14.

6.) Remove any additional packing material in front of and surrounding the SafeLock Cart. Using two people, carefully roll the Cart *forwards* down the unloading ramp to remove it completely from the shipping carton - see Figure 3-6 below.

CAUTION

Two people are required when moving the SafeLock Cart

This precaution is intended to prevent injury that may be caused by the weight of the machine if one person attempts to move the cart considerable distances or on an incline.

Make sure the Cart is standing firmly on the floor before applying the locking brake.

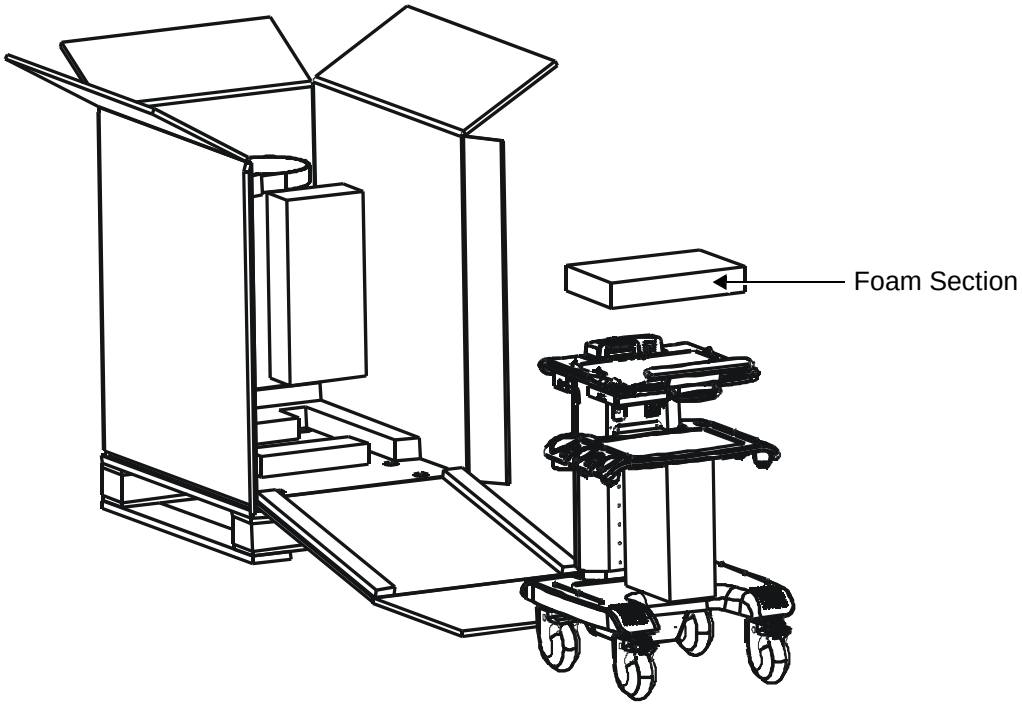


Figure 3-10 SafeLock Cart Removed from Shipping Carton

7.) Remove the foam sections from the top of the cart and from between the main shelf and probe shelf.

8.) Using the up/down handle, raise the main shelf up to appropriate height.

Note: The AC Cable Hook is packed separately in the shipping cart, as shown in Figure 3-11.

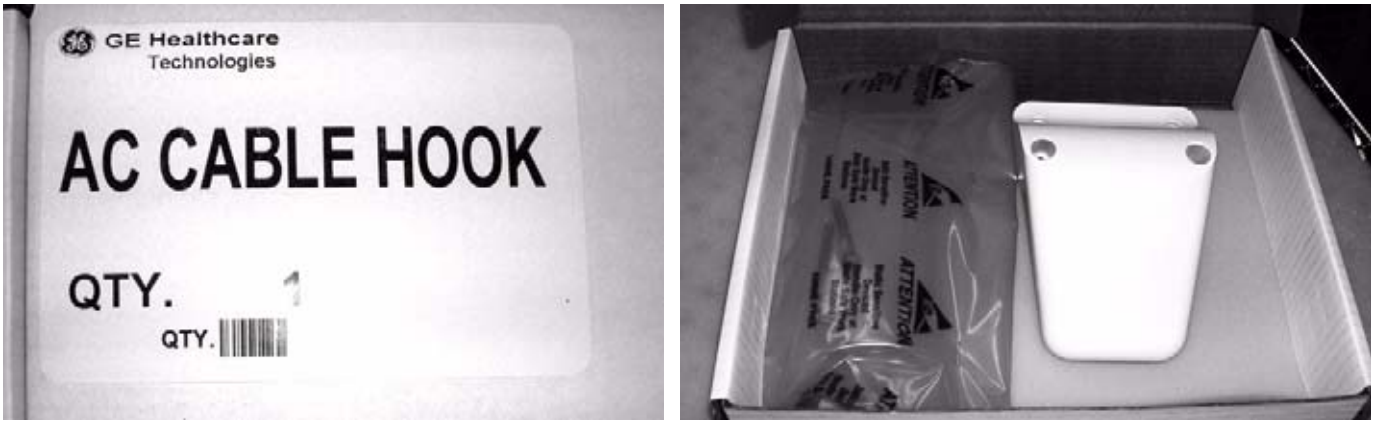


Figure 3-11 AC Cable Hook Package

9.) Install the AC Cable Hook on the Upper Cover (rear) and fasten securely with the four screws (supplied). Refer to Figure 8-83 on page 8-74.

10.) Before commencing the installation procedure, follow the instructions for Verifying the Shipping Carton Contents, below.

3-3-2 Verifying the Shipping Carton Contents

After unpacking, it is important to verify that all items ordered by the customer have been received (refer to Verifying the Shipping Carton Contents on page 3 - 14). Compare all items listed on the packing slip (shipping consignment note) with those received and report any items that are missing, back-ordered, or damaged, to your GE Medical Systems sales representative. The contact address is shown in Contact Information on page 1 - 19.

NOTICE It is recommended to keep and store the shipping carton and all other packing materials (including the support foams, anti-static plastic cover, etc.), in case the unit (and/or SafeLock Cart) has to be moved to a different location in the future.

For warranty purposes, storage of the above is required for one year from date of purchase.

3-3-3 Physical Inspection

3-3-3-1 System Voltage Settings

Verify that the Vivid-i™/ Vivid-q™ ultrasound AC adapter and SafeLock Cart (if applicable) are set to the correct voltage. The Voltage settings are 220-240V AC - (Europe, Latin America, and China).

WARNING *Setting the* Vivid-i™/ Vivid-q™ ultrasound components *to the wrong voltage setting will most likely destroy the equipment.*

3-3-4 EMI Protection

The Vivid-i™/ Vivid-q™ Ultrasound Unit has been designed to minimize the effects of Electro Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Section 3-4
Preparing for Installation

3-4-1 Confirming Customer Order

When preparing for installation of a Vivid-i™ or Vivid-q™ system, it is important to verify that all items ordered by the customer have been received. Compare all items listed on the packing slip (shipping consignment note) with those received and report any items that are missing, back-ordered, or damaged, to your GE Medical Systems sales representative.

3-4-2 Verifying the Shipping Carton Contents

The following sections list the contents of the shipping carton that are additional to the Vivid-i™ and Vivid-q™. These include external accessories and probes, as well as a regional language support kit, and optional peripherals (as ordered). Ensure that all relevant components are present before completing the installation.

*NOTE: The shipping carton contains an **External Accessory Kit and Optional Peripherals Check List**. When checking the contents of the carton, make sure the Check List is completed. In the event that any items are missing, contact your local GE Medical Systems representative.*

Table 3-5 External Accessory Kit

Part Description	Country	Part No
AC Adaptor	All (except Japan)	2378947-2
	Japan	2416024-2
DVD/RW	All	H45021GA
Internal Battery	All	2378963-2
Ethernet Isolation Box Assy	All	2409727
DVD/CD with Vivid-i™/ Vivid-q™ system software Ver 1.0.0	All	
ECG Cable	Europe	2378938
	USA	2378938-2
Power Cable (according to country)	Europe	2412094-2
	USA	2412094-16
	Japan	2412094-3
	UK	2412094-4
	Switzerland	2412094-5
	Italy	2412094-6
	Portugal	2412094-7
	Brazil	2412094-8
	Australia	2412094-9
	Israel	2412094-10
	China	2412094-11
Ultrasound Transmission GEL - Bottle	All	H45531HR
CD-R, DVD-R or DVD+R	All	E8001LD

3-4-2-1 Regional Language Support Kit

Table 3-6 Regional Language Support Kit

Part No	Part Description
H45031ZG	Vi/q BT11 France Reg&Lang
H45031ZH	Vi/q BT11 Eng Int Reg&Lang
H45031ZJ	Vi/q BT11 USA Reg&Lang
H45031ZK	Vi/q BT11 Germany Reg&Lang
H45031ZL	Vi/q BT11 Italy Reg&Lang
H45031ZM	Vi/q BT11 Spain Sup&Lang
H45031ZN	Vi/q BT11 LatAmerica Reg&Lang
H45031ZP	Vi/q BT11 Portugal Reg&Lang
H45031ZR	Vi/q BT11 Japan Reg&Lang
H45031ZS	Vi/q BT11 China Reg&Lang
H45031ZT	Vi/q BT11 Finland Reg&Lang
H45031ZW	Vi/q BT11 Netherl Reg&Lang
H45031ZX	Vi/q BT11 Greece Reg&Lang
H45031ZY	Vi/q BT11 Norway Reg&Lang
H45031ZZ	Vi/q BT11 Poland Reg&Lang
H45032AA	Vi/q BT11 Russia Reg&Lang
H45032AB	Vi/q BT11 Sweden Reg&Lang
H45032AC	Vi/q BT11 UK/240V Reg&Lang
H45032AD	Vi/q BT11 Brazil/120V Reg&Lan
H45032AE	Vi/q BT11 Denmark Reg&Lang
H45032AF	Vi/q BT11 Swiss Fr Reg&Lang
H45032AG	Vi/q BT11 Swiss De Reg&Lang
H45032AH	Vi/q BT11 Swiss It Reg&Lang
H45032AJ	Vi/q BT11 Australia Reg&Lang
H45032AK	Vi/q BT11 Hungary Reg&Lang
H45032AL	Vi/q BT11 Czech Reg&Lang
H45032AM	Vi/q BT11 Lithuania Reg&Lang
H45032AN	Vi/q BT11 Latvia Reg&Lang
H45032AP	Vi/q BT11 Slovakia Reg&Lang
H45032AR	Vi/q BT11 Romania Reg&Lang
H45032AS	Vi/q BT11 Bulgaria Reg&Lang
H45032AT	Vi/q BT11 Serbia Reg&Lang
H45032AW	Vi/q BT11 Korea Reg&Lang
H45032AX	Vi/q BT11 India/240V Reg&Lang
H45032AY	Vi/q BT11 Estonia Reg&Lang
H45032AZ	Vi/q BT11 Israel Reg&Lang
H45032BA	Vi/q BT11 Croatia Reg&Lang

Table 3-6 Regional Language Support Kit (cont'd)

Part No	Part Description
H45032BB	Vi/q BT11 SIovenia Reg&Lang
H45032BC	Vi/q BT11 Canada En Reg&Lang
H45032BD	Vi/q BT11 Canada Fr Reg&Lang
H45032BE	Vi/q BT11 French Int Reg&Lang

3-4-2-2 SafeLock Cart Regional Support Kit

Table 3-7 SafeLock Cart Regional Support Kit

Part No	Part Description
H45021BG	English Cart regional support kit (USA-110V)
H45021BH	English Cart regional support kit (Europe-220-240V)
H45021BJ	German Cart regional support kit
H45021BK	French Cart regional support kit
H45021BL	Spanish Cart regional support kit
H45021BM	Italian Cart regional support kit
H45021BN	Japanese Cart regional support kit
H45021BP	Chinese Cart regional support kit
H45021BS	Swiss Cart regional support kit
H45021BT	Israeli Cart regional support kit
H45021BW	Danish Cart regional support kit
H45021CN	Portuguese 220V regional cart support kit
H45021BR	Australian Cart regional support kit
H45021CP	English- UK/HK/Singapore cart support kit
H45021RZ	Indian Cart regional support kit

3-4-2-3 Optional Peripherals

The shipping carton will only contain any of the optional peripherals if they have been ordered with the Vivid-i™ or Vivid-q™ system. Table 3-8 below lists all possibilities.

Table 3-8 Optional Peripherals

Part No	Part Description
H45021GD	Portable Deskjet Printer
H45021NA	Professional InkJet Printer
H48681FB	Col Laser Printer 100-120V
H48681FC	Col Laser Printer 220-240V
H45021RY	Digital b/w Video Printer w/paper HG
H45021FG	Digital Color Video Printer
H45021FL	Video Scan Converter
E14731GE	Video Paper UPP110HD Box
E70151SA	Color Paper UPC21L Sony
H45021NF	USB Flash Card
H45021GA	Secondary DVD/CD-RW
H45021NG	MOD
H45001PG	S-VHS Video Tape Cassette

3-4-2-4 Vivid-i™/ Vivid-q™ Accessories

The shipping carton will only contain any of the accessories if they have been ordered with the Vivid-i™ or Vivid-q™ system. Table 3-9 below lists all possibilities.

Table 3-9 Accessories

Part No	Part Description
H45021CR	SafeLock Cart (220-240V)
H45021CS	SafeLock Cart (100-120V)
H45021YD	Add. shelf Cart S/N >5000
H45021KJ	Add. shelf Cart S/N <5000
H45031TJ	USB HDD RAID1
H45021TT	Roll Pac
H45021BB	Secondary Scanning Battery
H45021HK	Battery Charger
H45021KE	No-spill System Covers (100/pack)
H45021BD	Safety Lock
H45021BE	Secondary AC Adapter
H45021DE	Ext ECG Cable
H45031TE	ECG w. Respiration
H45031TF	Ext. Respiration Adapter
H45031BE	Ped ECG Adapter EU, Leads
H45031BF	Ped ECG Adapter US, Leads
H41642LS	Foot Switch

3-4-2-5 Probes

The shipping carton will contain the probes that have been ordered with the system.

For a list of probes available for use with the Vivid-i™/Vivid-q™ portable ultrasound scanner, refer to Available Probes on page 3 - 64.

3-4-3 Component Inspection

After verifying that all the required parts are included in the shipping crate, inspect the system components using the checklist supplied below. In addition, ensure that all the labels described in *Chapter 1 - Introduction* are present, accurate and in good condition, and enter the serial number printed on the main label into the system installation details card, as described in *System Installation Details* on page 3-186.

3-4-3-1 Damage Inspection Checklist

Visually inspect the contents of the shipping carton for damage. If any parts are damaged or missing, contact an authorized GE Service Representative.

A *Damage Inspection Checklist* for the Vivid-i™/Vivid-q™ portable ultrasound scanner is provided in Table 3-10 below.

A *Damage Inspection Checklist* for the SafeLock Cart (optional) is provided in Table 3-11 on page 3-20.

Table 3-10 Damage Inspection Checklist - Vivid-i™/ Vivid-q™ System

✔	Step	Item	Recommended Procedure
	1	Console	Verify that the system is switched OFF and unplugged. Clean the console and control panel.
	2	Control Console	Physically inspect the control console for missing or damaged items. Verify the proper illumination of all the control panel buttons.
	3	Probes	Check all probes for wear and tear on the lens, cable, and connector. Look for bent or damaged pins on the connector and in the connector socket on the unit. Verify that the EMI fingers around the probe connector socket housing are intact. Check the probe locking mechanism and probe switch.
	4	LCD Display	Clean the LCD display by gently wiping with a dry, soft, lint-free non-abrasive folded cloth. Inspect the monitor for scratches and raster burn.
	5	Fans	Verify that the system's cooling fans and peripheral fans are operating.
	6	Rear Panel	Check the rear panel connectors for bent pins, loose connections and loose or missing hardware. Screw all the cable connectors tightly to the connector sockets on the panel. Verify that the labeling is in good condition.
	7	Covers	Check that all screws are tightly secured in place, that there are no dents or scratches and that no internal parts are exposed.
	8	Peripherals	Check and clean the peripherals in accordance with the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
	9	AC DC System	Check the AC DC unit is not damaged or cracked board and verify that the output cable is properly secured.
	10	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity. Replace the power cord, as required.

Table 3-11 Damage Inspection Checklist - SafeLock Cart (optional)

✔	Step	Item	Recommended Procedure
	1	Probe Holders	Clean the gel wells with warm water and a damp cloth to remove all traces of gel.
	2	Peripheral Power and USB Audio Panels	Check the panel connectors for bent pins, loose connections and loose or missing hardware. Screw all the cable connectors tightly to the connector sockets on the panel. Verify that the labeling is in good condition.
	3	Covers	Check that all screws are in place, all chassis and internal covers are installed.
	4	Peripherals	Check and clean the peripherals in accordance with the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
	5	AC System	Check the AC board connectors and the associated cabling for good connection and proper insulation. Verify that the connections are secured.
	6	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity. Tighten the clamps that secure the power cord to the unit and the outlet plug to the cord. Replace the power cord and/or clamp, as required.
	7	Front Castors	Check that the front castors can swivel, and can be placed in the locked position by pressing the foot brake lever (lower) *down* on each castor. Check that the upper lever releases the wheel lock on each castor wheel.
	8	Rear Castors	Check that the rear castors can roll and swivel.

3-4-3-2 Front and Side View of the Vivid-i™/ Vivid-q™ Ultrasound Unit

Figure 3-12 below shows the Vivid-i™/ Vivid-q™ ultrasound unit components that are visible from the *front* and *side* of the ultrasound unit.

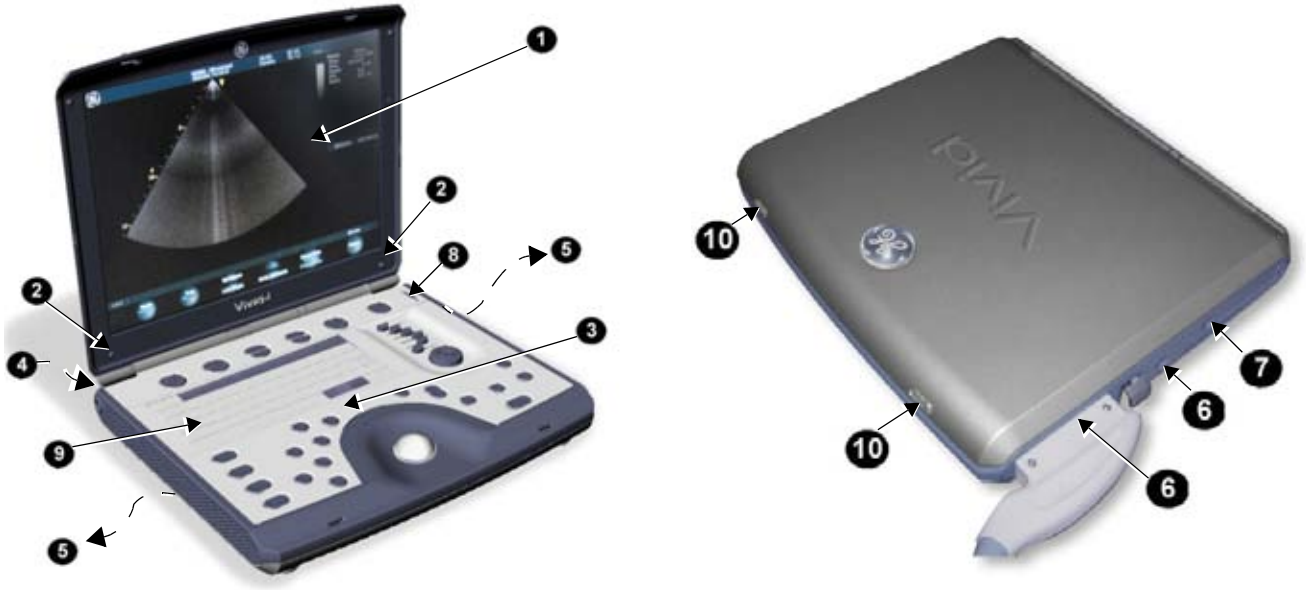


Figure 3-12 Front and Side View of the Vivid-i™

1 **Display Monitor:** tilts up and down.

2 **Speakers:** Two loudspeakers for Doppler sound

3 **Control Panel:** Contains the alphanumeric keyboard and the buttons used to operate the ultrasound unit.

4 **Rear Handle**

5 **Air Vents**

6 **Probe Ports:** Two active probe connectors (one for a pencil probe).

7 **ECG Connector**

8 **ON/OFF Switch**

9 **Alphanumeric Keyboard and Operation Button**

10 **Release Latch**

3-4-3-3 Rear View of the Vivid-i™ and Vivid-q™ Ultrasound Unit

Figure 3-13 shows a view of the Vivid-i™/ Vivid-q™ ultrasound unit rear panel and external peripheral/accessory connectors

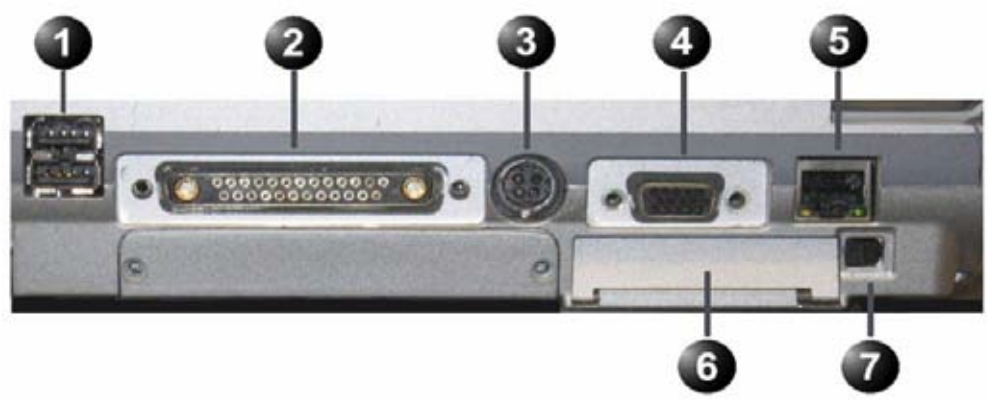


Figure 3-13 View of the Vivid-i™/ Vivid-q™ Rear Panel

1 Two interchangeable USB ports (digital printer, CD-RW and other peripherals)

2 Docking connector (currently not in use)

3 Port for DC IN (AC Adapter)

4 SVGA Output (VCR option or CRT monitor option)

5 LAN 10/100 Base-TX Ethernet network connector

6 PCMCIA port for PC card.

7 Ejection lever for PCMCIA device

3-4-3-4 Vivid-i™/ Vivid-q™ SafeLock Cart

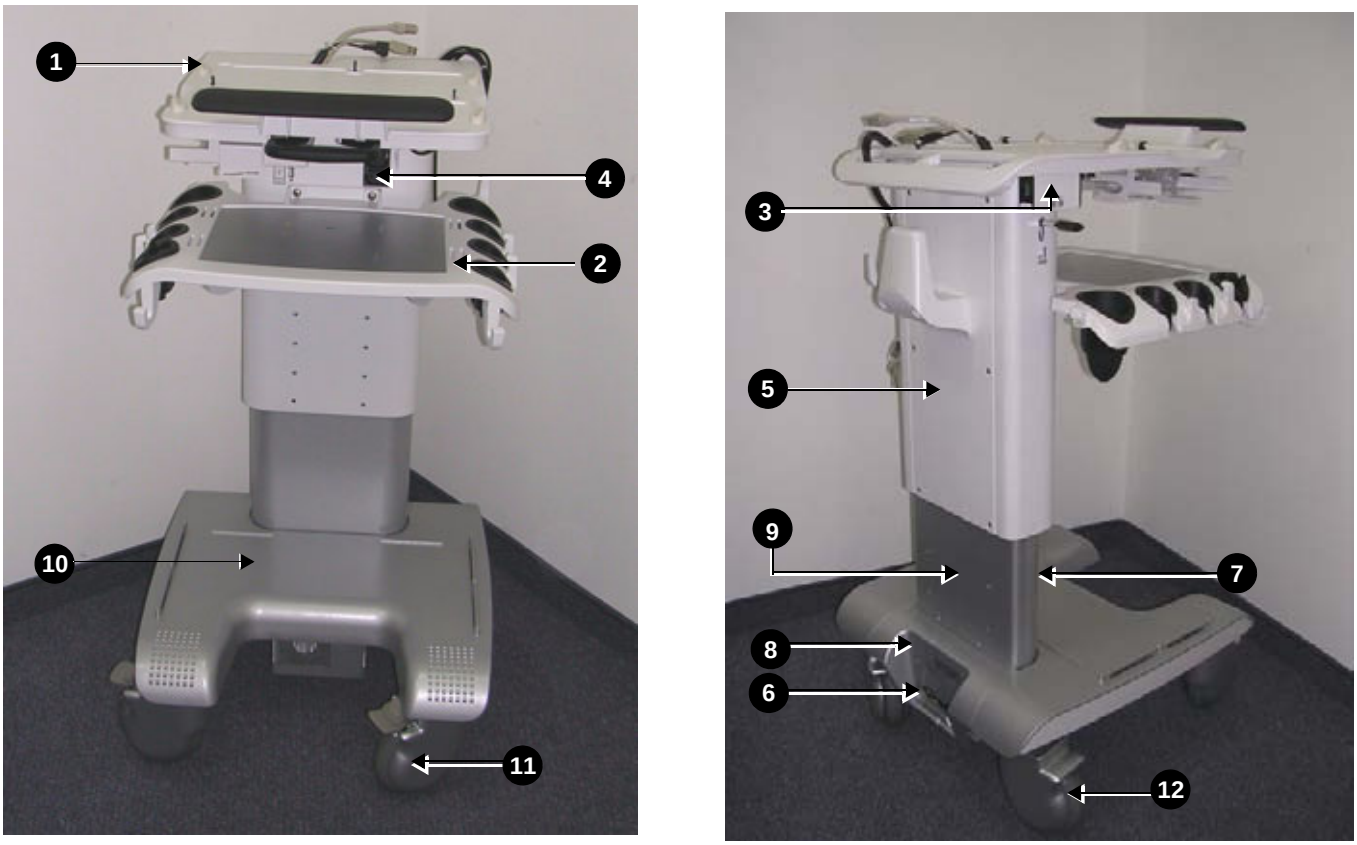


Figure 3-14 Vivid-i™/ Vivid-q™ SafeLock Cart Components

Table 3-12 Vivid-i™/ Vivid-q™ SafeLock Cart Components

Label	Item	Label	Item
1	Top Shelf Assembly (with handle)	7	Bottom Cover - Front
2	Probe Shelf (with probe holders)	8	Bottom Cover - Rear (AC Assembly Cover)
3	LAN Isolation Box	9	Rear Lower Cover
4	Peripheral Power Outlet	10	SafeLock Cart Bottom Assembly
5	Rear Upper Cover	11	Front Wheels (with locking lever)
6	AC Distribution Assembly (behind cover)	12	Rear Wheels

3-4-4 System Voltage Confirmation

3-4-4-1 System Voltage Settings

Verify that the Vivid-i™/Vivid-q™ portable ultrasound scanner is set to the correct voltage. The Vivid-i™ and Vivid-q™ voltage settings are found on the base (underside) of the system.

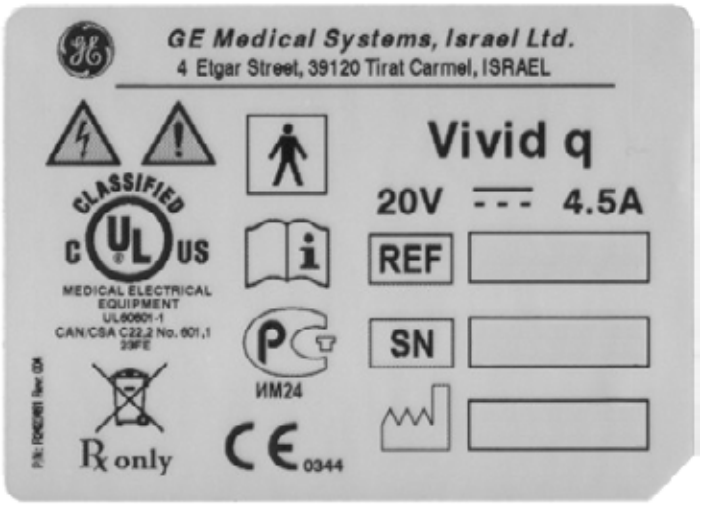


Figure 3-15 Safety Rating Plate - Example

WARNING: Connecting the Vivid-i™/ Vivid-q™ to the wrong voltage level will most likely destroy the scanner.

3-4-4-2 Confirming SafeLock Cart Voltage Configuration

1) Check the safety rating plate located at the rear of the SafeLock Cart, above AC input connector.
2) Remove the bottom cover (rear) from the SafeLock Cart to provide access to the jumper on the AC unit. See Figure 3-16 below.

Figure 3-16 Jumper on AC Unit

3.) Make sure that the jumper is set to either 100 to 120 V AC or to 220 - 240 V AC, in accordance with the voltage rating shown on the safety rating plate (step 1).

Figure 3-17 below shows the jumper removed in order to demonstrate the voltage marking.

Figure 3-17 SafeLock Cart (Old-type) Voltage Setting

NOTICE If the rating stated on the jumper does not correspond to that on the rating plate, the correct jumper must be obtained from GE Medical Systems Make Center.

3-4-5 Ensuring Protection from EMI

The Vivid-i™/ Vivid-q™ unit has been designed to minimize the effects of Electro-Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Ensure that the system is protected from electromagnetic interference (EMI), as follows:

- Operate the system at least 15 feet away from equipment that emits strong electromagnetic radiation.
- Operate the system in an area enclosed by walls, floors and ceilings comprised of wood, plaster or concrete, which help prevent EMI.
- Shield the system when operating it in the vicinity of radio broadcast equipment, if necessary.
- Do not operate mobile phones or other EMI emitting devices in the ultrasound room.
- Verify that all EMI rules listed in the following table are followed:

Note: The Vivid-i™/ Vivid-q™ ultrasound unit is approved for use in hospitals, clinics and other environmentally qualified facilities, in terms of the prevention of radio wave interference.

Operation of the ultrasound unit in an inappropriate environment can cause electronic interference to radios and television sets situated near the medical equipment.

Table 3-13 EMI Prevention/ Abatement

EMI Rule	Details
Ground the unit.	Poor grounding is the most likely reason an ultrasound unit will have noisy images. Check the grounding of the power cord and power outlet.
Be aware of RF sources.	Keep the unit at least 5m (16.4 ft) away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Replace and/or reassemble all screws, RF gaskets, covers and cores.	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of the card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets.	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn on the unit until any loose metallic part is removed and replaced if needed.
Do not place labels where RF gaskets touch metal.	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. In case a label has been found in such a location, move the label to a different appropriate location.
Use GE specified harnesses and peripherals.	The interconnect cables are grounded and require ferrite beads and other shielding. Cable length, material, and routing are all important; do not make any changes that do not meet all specifications.
Take care with cellular phones.	Cellular phones may transmit a 5 V/m signal that causes image artifacts.
Properly address peripheral cables.	Do not allow cables to lie across the top of the card cage or hang out of the peripheral bays. Loop any peripheral cable excess length inside the peripheral bays or hang on the hooks provided below the console. Attach the monitor cables to the frame.

Section 3-5
Completing the Hardware Installation

The hardware installation procedures described in this section provide instructions and information for the possible scenarios, as follows:

- Vivid-i™/ Vivid-q™ scanner but no SafeLock Cart - connections direct to the system
- Vivid-i™/ Vivid-q™ scanner with SafeLock Cart
- Vivid-i™/ Vivid-q™ scanner but no SafeLock Cart - connections via USB hub

3-5-1 Connecting Peripherals

NOTE: All peripherals mounted on the SafeLock Cart must be firmly secured in position using the securing straps supplied with the SafeLock Cart. These straps are fastened through the metal bars located on each side of the cart and serve to hold the peripheral firmly in place.

For instructions on mounting the Vivid-i™/ Vivid-q™ scanner on the SafeLock Cart, refer to Mounting the Vivid-i™/ Vivid-q™ on the SafeLock Cart (optional) on page 3 - 71.

Following the connection and removal of peripherals, perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
- Chassis Current Leakage Test on page 10 - 24

3-5-1-1 USB Global Modem

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

The USB Global Modem connection in the different scenarios is explained below.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

The USB Global modem can be powered via the USB port on the Vivid-i™/ Vivid-q™ system with no need for additional power. The modem should be connected to the *lower* USB port on the rear connectors panel.

When connecting the modem, there is no preference as to which cable to connect first. One end of the telephone cable can be connected to the wall outlet and the other side to the modem, followed by connecting one end of the USB cable to the modem and the other side to the *lower* USB port on the rear connectors panel.

All software drivers for the modem are pre-installed for the specific modem type. One must follow the i-Linq configuration procedure to complete the check-out process.

WARNING *Do not attempt to use a different type of modem either via the PC MCIA or USB ports. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!*

- No SafeLock Cart - connection via USB hub

This is not an approved configuration and, in most cases, will not work and will cause software complications.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

This is not an approved configuration and, in most cases, will not work and will cause software complications.

3-5-1-2 Wireless USB Network Adaptor

CAUTION: For network security reasons, when configuring the wireless USB network adaptor on the Vivid-i™/ Vivid-q™ system, do not use the USB ports on the SafeLock cart.

CAUTION: For network security reasons, both USB ports on the Vivid-i™/ Vivid-q™ system must be configured separately when installing the wireless USB network adaptor.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

  The installation procedure requires connecting the DVD-CD drive. The procedure includes installing the Compact Wireless-G USB Adaptor software and then the configuration procedure, which is performed via the Windows Network Connections support screens.
  For procedure instructions, see Wireless USB Network Configuration on page 3 - 97.

WARNING *Do not use any other type of wireless adaptor other than the LinkSys WSUB54GC WLAN card. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!*

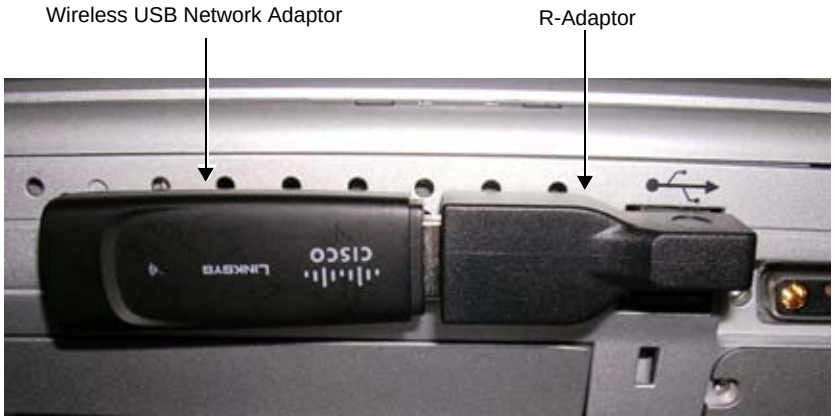


Figure 3-18 Wireless USB Network Adaptor Connected to Rear of Vivid-i™/ Vivid-q™ Scanner

3-5-1-3 DVD/CD-RW Drive

NOTE: The procedures in Section 3-5-1-3-1 and 3-5-1-3-2 describe replacement of the Samsung DVD/CD-RW drive (Model SE-TO84M/RSBN).

NOTE: .If replacing a new-type Samsung DVD/CD-RW drive (Model SE-TO84M/RSBN) with a new one of the same model, prior to the procedure it is necessary to order the DVD Kit (P/N S2423870 - Table 3-14). Depending on the condition of the existing cables, it also may be necessary to order the Samsung Cable Kit (S2423956) - see Table 3-15.

NOTE: If replacing only cables, it is only necessary to order the Samsung Cable Kit (S2423956) - see Table 3-15.

The Samsung DVD SE-TO84M/RSBN Kit (P/N S2423870) includes the following:

Table 3-14 Samsung DVD SE-TO84M/RSBN Kit (P/N S2423870)

Part No	Part Description
RS2423870	Samsung DVD SE-TO84M/RSBN
R2423877	DVD Patch CD
2418071INS	Pocket DVD with USB Installation Guide

The Samsung cable kit for DVD SE-TO84M/RSBN (P/N **S2423956**) includes the following:

Table 3-15 Samsung Cable Kit (S2423956)

Part No	Country
RS2423951	2 Port USB cable Vivid-i™ SafeLock Cart
R2423953	5V Medical Grade AC Adaptor
R24123781	DVD to Distribution USB Cable

NOTICE IMPORTANT - the following steps must be performed **in the order stated**.
(If the USB cable is connected first while power to the Vivid-i™/ Vivid-q™ is ON, the drive will not be recognized. In this event, it will be necessary to re-boot the system).

CAUTION: Do not disrupt power to the Samsung DVD-R/RW drive from its AC/DC adapter while the USB cable is connected to the Vivid-i™/ Vivid-q™ system.
In this event, the system will stop recognizing the CD/DVD drive or any other device connected to this USB port. A complete system re-boot will then be required to make the USB port operational again.

NOTICE IMPORTANT: Use only CD-R, DVD-R or DVD+R media from a reputable vendor and only high-grade media types.

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NOTICE IMPORTANT - Always follow the safety instructions provided with the Samsung DVD-R/RW drive and supplied by the manufacturer.

The Samsung DVD-R/RW drive, which is designed to operate with the Vivid-i™/ Vivid-q™ system using the USB port, combines the functions of a DVD or CD recorder, and a DVD or CD player.

This DVD device may be used on the Vivid-i™/ Vivid-q™ system for the following purposes:

- To format and label each media before use
- To *export* Exams from the Vivid-i™/ Vivid-q™ system to media
- To *import* Exams from media to the Vivid-i™/ Vivid-q™ system
- To perform the Database Backup procedure - in order to store back-up copies of patient Exams (data Archive) and also to create free space on the local hard disk.

- To export Exams in MPEGVue mode, whereby the media can be viewed on any external PC
- To load or upgrade system software, and for the use of GE Healthcare Field Engineers when performing various other functions.

Note: For more details, refer to the latest version of the Vivid-i™/Vivid-q™ User Manual (P/N 2378958-100). Refer in particular to the *Archive* chapter.

3-5-1-3-1 Samsung DVD/CD-RW Drive Replacement on Vivid-i™/ Vivid-q™ Systems without SafeLock Cart

NOTE: This procedure relates to DVD/CD-RW Drive Samsung Model SE-TO84M/RSBN.

Removal Procedure

1.) To remove the Samsung DVD/CD-RW drive (Model SE-TO84M/RSBN):
   a.) Disconnect the USB cable that connects the Vivid-i™/ Vivid-q™ rear panel to the Samsung DVD/CD-RW drive rear panel.
   b.) Disconnect the 5V power supply output cable from the power port on the Samsung DVD-R/RW drive rear panel.
2.) Remove the Samsung DVD/CD-RW drive from the system.

Installation Procedure

1.) Unpack the contents of the Samsung Cable Kit (P/N S2423956).
2.) Connect the mini USB connector (Figure 3-19) into the mini USB port located at the rear of the replacement Samsung DVD/CD-RW Drive (Figure 3-20).

Figure 3-19 Vivid-i™/ Vivid-q™ Power Supply with Two USB Connectors

Figure 3-20 Mini USB Port on Samsung DVD/CD-RW Drive

3.) Connect the other end of the USB cable to the Vivid-i™/ Vivid-q™ USB port at the rear of the Vivid-i™/ Vivid-q™ - see Figure 3-21.

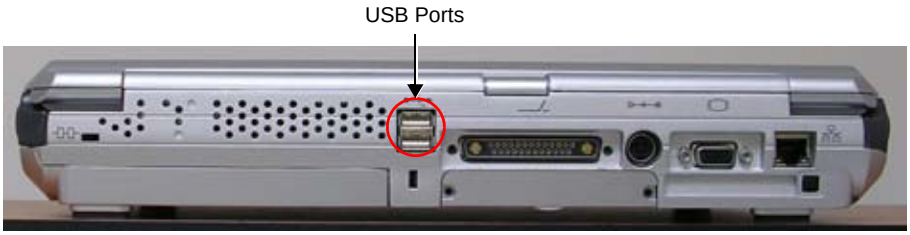


Figure 3-21 USB Ports Located at Rear of the Vivid-i™/ Vivid-q™

4.) Plug the power supply into the mains power supply.

5.) Insert the DVD Patch CD R2423877 into the DVD/CD-RW Drive and follow the on-screen instructions to load the software patch.

6.) When done, remove the CD from the drive.

7.) Perform the following tests:

a.) Insert a CD-R disk in the DVD/CD-RW Drive.

b.) Eject and remove the CD-R disk to check the eject mechanism functions properly.

NOTE: In the event that problems are experienced when exporting to DVD media, the error message "Failed to finalize media" is displayed. It is therefore recommended to use the Medical Grade 5V Power Supply for DVD Samsung Universal (P/N 2421169) and connect it to the peripheral outlet on the SafeLock Cart, as shown in Figure 3-22.

Figure 3-22 Samsung DVD/CD-RW Drive Connected through 5V Power Supply

3-5-1-3-2 DVD/CD-RW Drive Replacement on Vivid-i™/ Vivid-q™ Systems with SafeLock Cart

NOTE: This procedure relates to DVD/CD-RW Drive Samsung Model SE-TO84M/RSBN.

Removal Procedure

1.) Turn OFF the power to the Vivid-i™/ Vivid-q™ scanner and switch off the circuit breaker.
2.) Disconnect the power from the SafeLock Cart and from the Vivid-i™/ Vivid-q™ scanner.
3.) Disconnect the USB cable from the USB hub located on the SafeLock Cart main column.
4.) Disconnect both ends of the 5V power outlet (one end from the SafeLock Cart main column power and the other from the Samsung DVD-R/RW drive rear panel).
5.) Release the locking arm (retaining clamp lever) located beneath the specially-designed shelf (DVD-R/RW drive compartment) beneath the upper shelf of the SafeLock Cart (see Figure 3-23).
6.) Slide the Samsung DVD-R/RW drive out of the compartment and remove it from the SafeLock Cart.

Installation Procedure

1.) Slide the replacement Samsung DVD-R/RW drive into the DVD-R/RW drive compartment located beneath the upper shelf of the SafeLock Cart.
2.) Secure it in position by closing the retaining clamp lever - see Figure 3-23.

Figure 3-23 Retaining Clamp for DVD-R/RW Drive

3.) Using the USB cable for the Samsung DVD-R/RW (see Figure 3-24), plug the mini USB connector

into the mini USB port located at the rear of the Samsung DVD/CD-RW Drive - see Figure 3-25.

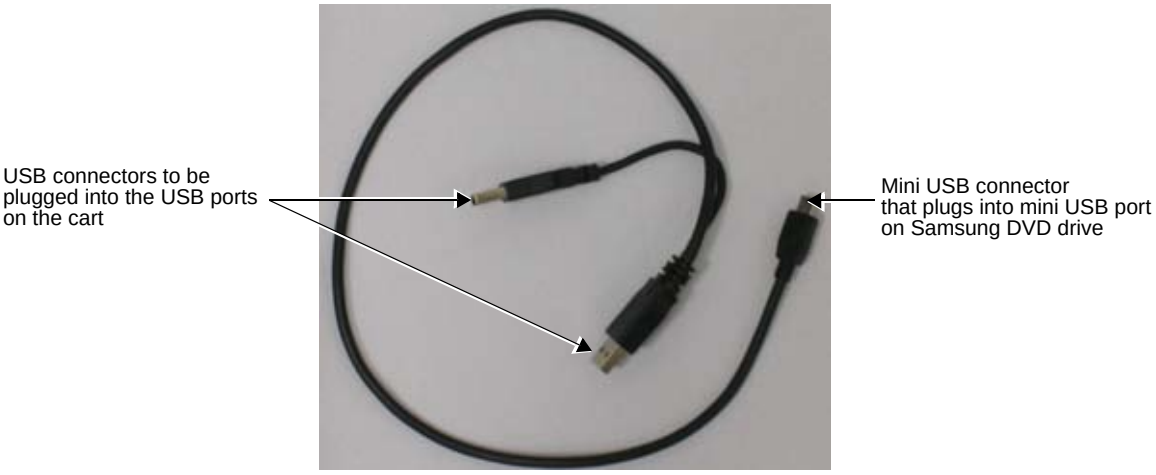

USB connectors to be plugged into the USB ports on the cart
Mini USB connector that plugs into mini USB port on Samsung DVD drive

Figure 3-24 Cable for Installation on Vivid-i™/ Vivid-q™ Cart

Figure 3-25 USB Cable Plugged Into the DVD/CD Drive and the Cart's USB Connectors

4.) Plug the USB connectors into the USB ports located below the upper shelf of the SafeLock Cart - see Figure 3-25 and Figure 3-26.

Figure 3-26 USB ports Located Below the Support Tray of the Vivid-i™/ Vivid-q™ Cart

5.) Connect the USB cable located on the SafeLock Cart main column, into the USB port located at the rear of the Vivid-i™/ Vivid-q™ system (Figure 3-21 on page 3-32).

6.) Re-connect power to the SafeLock Cart and to the Vivid-i™/ Vivid-q™ system.
7.) Switch on the circuit breaker and turn ON power to the Vivid-i™/ Vivid-q™ system.
8.) Perform the following test:
   a.) Insert a CD-R disk in the DVD/CD-RW Drive.
   b.) Eject and remove the CD-R disk to check the eject mechanism functions properly.

3-5-1-4 MOD Drive

NOTICE **IMPORTANT *Do not connect the MOD Drive to the Vivid-i™/ Vivid-q™ system while scanning is in progress!***

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-28 MOD Drive

The MOD drive connection in the different scenarios is explained below.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

  The MOD Drive can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel. This connection must be via a USB-to-SCSI adaptor; one side of the adaptor being connected to the Vivid-i™/ Vivid-q™ USB port, and the other side to the rear of the MOD drive.

  When connecting the MOD drive directly to the system, it is necessary to use an additional power source. **As a safety precaution, this must be done via an isolation transformer.**

The MOD Drive may be connected once the system is powered ON, or after shutdown. All software drivers for the MOD Drive are pre-configured and installed designated to be used with the specific MOD drive supplied by GE Medical Systems.

WARNING ***Do not attempt to use a different type of mass storage device other than the MOD Drive supplied with the system. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

- No SafeLock Cart - connection via USB hub

  As stated above. **Safety considerations must be taken into account. The MOD Drive must be powered via an isolation transformer.** Either USB port may be used to communicate with the MOD device.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  The MOD device can be connected to any of the USB outlets provided on the SafeLock Cart. One must use the additional power source to activate the MOD Drive. However, this must be powered from the SafeLock Cart itself, via one of the isolated peripheral power outlets provided on the cart.

3-5-1-5 External USB Hard Disk

NOTICE **IMPORTANT** ***Do not connect the External USB Hard Disk to the Vivid-i™/ Vivid-q™ system while scanning is in progress!***

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-29 External USB Hard Disk

The External USB Hard Disk can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

One must use the additional power source (supplied with the External USB Hard Disk) to activate the External USB Hard Disk.

WARNING ***Do not attempt to use a different type of mass storage device other than the External USB Hard Disk supplied with the system. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

Refer to the *External USB Hard Disk Installation Procedure* section, page 8-155 for instructions on initial configuration and connecting the External USB Hard Disk to the Vivid-i™/Vivid-q™ portable ultrasound scanner scanner.

3-5-1-6 USB Memory Stick

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

The USB Memory Stick (disk-on-key) connection in the different scenarios is explained below.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

  The USB Memory Stick may be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

  The USB Memory Stick can be connected once the system is powered ON, or after shutdown. All software drivers for the USB Memory Stick are pre-installed on the system. The system is capable of detecting and working with other types of memory sticks. However, it is highly recommended to use the memory stick that is provided and approved by GE Medical Systems. Other memory sticks may be sensitive to EMC interference - this may affect system performance and/or image quality.

- No SafeLock Cart - connection via USB hub

  As above. If applicable, the USB hub must be powered via the isolation transformer.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  As above.

3-5-1-7 Foot Switch

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-30 Foot Switch

The Foot Switch (USB) connection in the different scenarios is explained below.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

  The Foot Switch may be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

  The Foot Switch can be connected once the system is powered ON, or after shutdown. All software drivers for the Foot Switch are pre-installed on the system.

- No SafeLock Cart - connection via USB hub

  As above. If applicable, the USB hub must be powered via the isolation transformer.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  As above.

NOTE: After connecting the Foot Switch to the system, define the required functionality settings, as follows:

1.) Press **Config** to access the Configuration screen.

2.) Select **Imaging**, then activate the **Application** tab - see Figure 3-31.

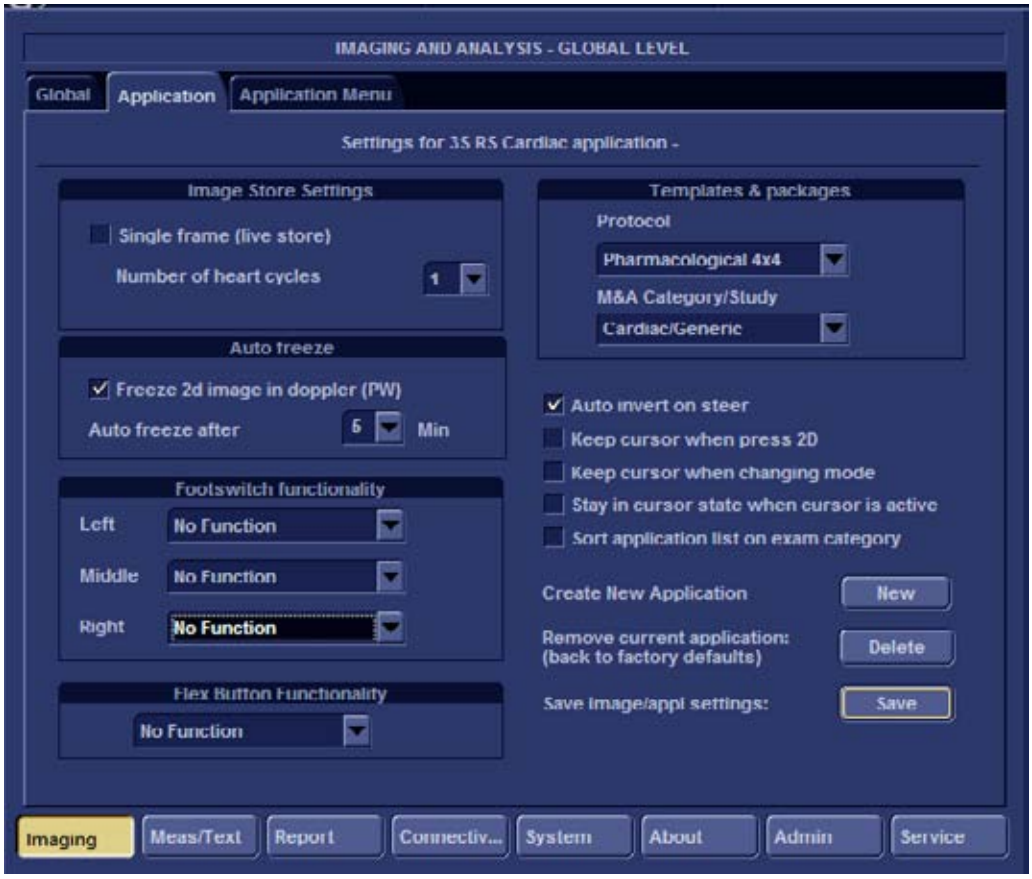


Figure 3-31 Application Tab

3.) Using the **Footswitch Functionality** drop-down menus, select the required functionality for the **Left**, **Middle** and/or **Right** Foot Switch - see the example in Figure 3-32**.**

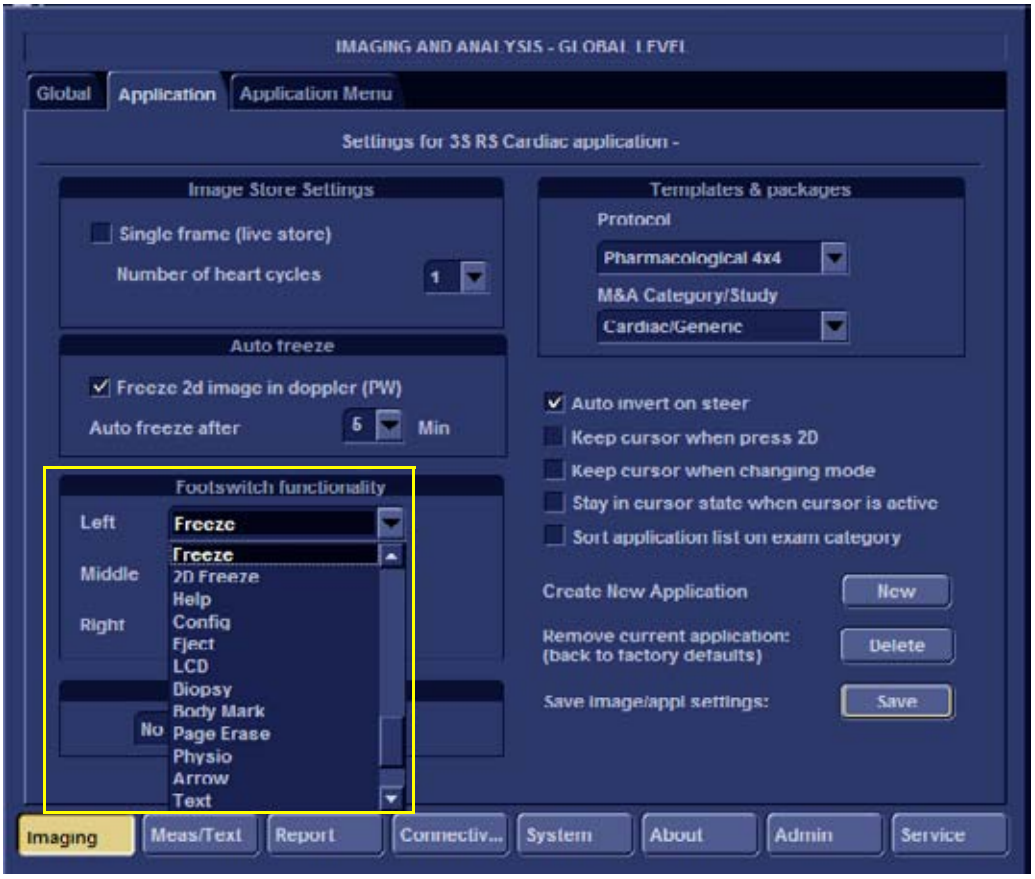


Figure 3-32 Foot Switch Functionality Settings

3-5-1-8 Connecting the HP Officejet Pro 8000 Color Printer

Figure 3-33 HP Officejet Pro 8000 Color Printer

3-5-1-8-1 Connecting the HP Officejet Pro 8000 to the Vivid-i™ and Vivid-q™ Scanner Mounted on the SafeLock Cart

NOTE: Follow the installation procedure for mounting the Vivid i/q system on the SafeLock cart, as described in Mounting the Vivid-i™/ Vivid-q™ on the SafeLock Cart (optional) on page 3 - 71.

NOTE: When using the Vivid i/q system mounted on the SafeLockcart, the HP Officejet Pro 8000 printer must be connected to the AC outlet at the rear of the SafeLock cart - see Figure 3-34.

1.) Connect the printer to the AC power outlet located at the rear of the SafeLock cart.
2.) Plug the SafeLock cart into the mains power supply.
3.) Using the USB communications cable, connect the HP Officejet Pro 8000 printer to the Vivid i/q system.

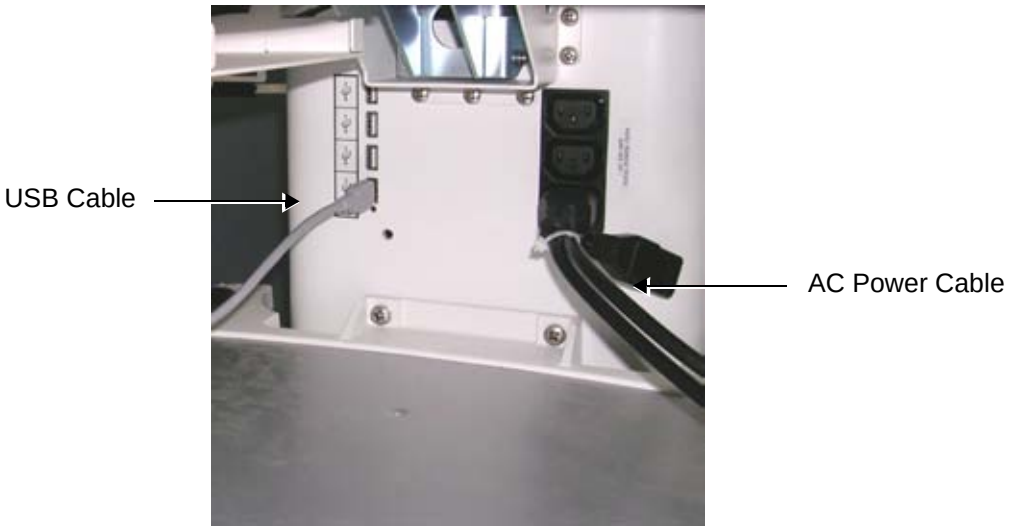


Figure 3-34 AC Power Cable and USB Cable Connected to SafeLock Cart

4.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
- Chassis Current Leakage Test on page 10 - 24
- Color Printer Test on page 4 - 30

3-5-1-8-2 Connecting the HP Officejet Pro 8000 Directly to the Vivid-i™ and Vivid-q™ System

TBD

3-5-1-9 Connecting the Black & White Printer

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-35 Black and White Printer

The B/W Printer connection in the different scenarios is explained below.

NOTE: After physical connection of the printer to the Vivid-i™/ Vivid-q™system, to configure the appropriate hot keys to activate printing direct from the control panel, follow the instructions in Configuring Hot Keys to Activate Printing Direct from the Control Panel on page 3 - 44.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

  The B/W Printer can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

  When connecting the B/W Printer directly to the system, it is necessary to use an additional power source. **As a safety precaution, this must be done via an isolation transformer.**

  The B/W Printer can be connected once the system is powered ON, or after shutdown. All software drivers for the B/W Printer are pre-configured and installed designated to be used with the specific B/W Printer supplied by GE Medical Systems.

WARNING *Do not attempt to use a different type of B/W Printer (brand or model) other than the B/W Printer provided by* GE Medical Systems*. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!*

- No SafeLock Cart - connection via USB hub

As stated above. **Safety considerations must be taken into account. The B/W Printer must be powered via an isolation transformer.** Either USB port may be used to communicate with the device.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  The B/W Printer may be connected to any of the USB outlets provided on the SafeLock Cart. You must use the additional power source to activate the B/W Printer. However, this must be powered from the SafeLock Cart itself, via one of the isolated peripheral power outlets provided on the cart.

NOTE: Once the printer is connected, perform the following functionality check:

- B/W and Color Printer Test on page 4 - 30 should be performed

3-5-1-10 Connecting the Digital Color Printer

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

NOTE: After physical connection of the printer to the Vivid-i™/ Vivid-q™system, to configure the appropriate hot keys to activate printing direct from the control panel, follow the instructions in Configuring Hot Keys to Activate Printing Direct from the Control Panel on page 3 - 44.

Figure 3-36 Digital Color Printer

The Digital Color Printer connection in the different scenarios is explained below.

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

  The Digital Color Printer can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

  When connecting the Digital Color Printer directly to the system, it is necessary to use an additional power source. **As a safety precaution, this must be done via an isolation transformer.**

  The Digital Color Printer can be connected once the system is powered ON, or after shutdown. All software drivers for the Digital Color Printer are pre-configured and installed designated to be used with the specific Digital Color Printer supplied by GE Medical Systems.

WARNING *Do not attempt to use a different type of Digital Color Printer (brand or model) other than the Digital Color Printer provided by* GE Medical Systems***. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

- No SafeLock Cart - connection via USB hub

As stated above. **Safety considerations must be taken into account. The Digital Color Printer must be powered via an isolation transformer.** Either USB port may be used to communicate with the device.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  The Digital Color Printer may be connected to any of the USB outlets provided on the SafeLock Cart. One must use the additional power source to activate the Digital Color Printer. However, this must be powered from the SafeLock Cart itself, via one of the isolated peripheral power outlets provided on the cart.

NOTE: Once the printer is connected, perform the following functionality check:

- Color Printer Test on page 4 - 30

3-5-1-11 Configuring Hot Keys to Activate Printing Direct from the Control Panel

1.) Press **Config** (or F2).
2.) Select **Connectivity** (in the lower part of window).
3.) Select the **Additional Outputs** tab.

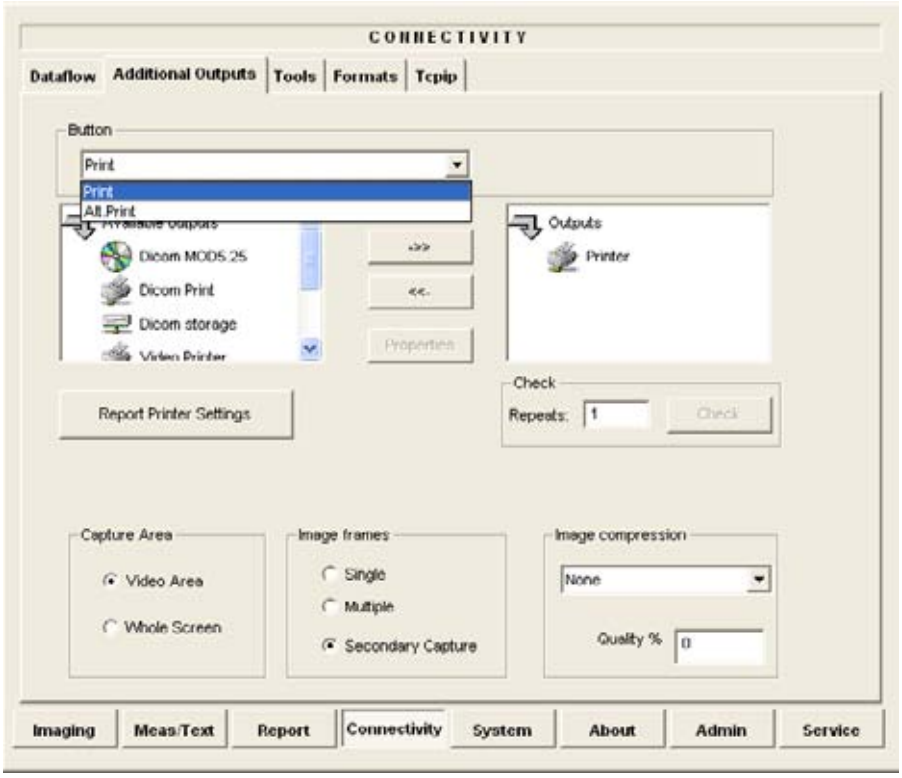


Figure 3-37 Configuring Control Panel Hot Keys for Printing

4.) From the Button drop-down menu (see Figure 3-37), select to configure either the **Print** button or **Alt+Print** to activate a variety of outputs.
5.) Use the *left* or *right* arrows below to add any of the available options (listed on the left) as **Outputs** (listed on right).
6.) From the listed **Outputs**, select (highlight) the required output, right-click and select **Properties** to configure the output device accordingly.

Printing may now be activated direct from the Vivid-i™/ Vivid-q™ Control Panel, using the hot key you have configured for this purpose.

7.) Proceed to perform the B/W and Color Printer Test on page 4 - 30.

3-5-1-12 Connecting the DeskJet Color Printer

NOTICE **IMPORTANT *Do not connect the DeskJet Color Printer to the Vivid-i™/ Vivid-q™ system while scanning is in progress!***

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-38 DeskJet Color Printer

The DeskJet Color Printer connection in the different scenarios is explained below.

- Connection via LAN

  There are a few DeskJet Color Printers that can be connected to the system via LAN - refer to Add Printer on page 3 - 86. The DeskJet Color Printer can be connected to an external, non-isolated power source.

WARNING *Do not attempt to use a different type of DeskJet Color Printer (brand or model) other than the DeskJet Color Printer provided by* GE Medical Systems*. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!*

- **No SafeLock Cart - connection directly to the Vivid-i™/ Vivid-q™ system**

This only applies to HP 460 models which are supplied pre-installed with the appropriate software drivers. The DeskJet Color Printer can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

When connecting directly to the system it is necessary to use an additional power source. **As a safety precaution, this must be done via an isolation transformer**.

The DeskJet Color Printer can be connected once the system is powered ON, or after shutdown.

WARNING ***Do not attempt to use a different type of DeskJet Color Printer (brand or model) other than the DeskJet Color Printer provided by*** GE Medical Systems***. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

- No SafeLock Cart - connection via USB hub

  As stated above. **Safety considerations must be taken into account. The DeskJet Color Printer must be powered via an isolation transformer.** Either USB port may be used to communicate with the device.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  The DeskJet Color Printer may be connected to any of the USB outlets provided on the SafeLock Cart. One must use the additional power source to activate the DeskJet Color Printer. However, this must be powered from the SafeLock Cart itself, via one of the isolated peripheral power outlets provided on the cart.

3-5-1-13 Configuring Printing Orientation (Portrait or Landscape) and Paper Size

To change the printing orientation and printing paper size, configure the printer as described below.

To configure printers for portrait/landscape printing, the change must be performed at the Windows operating system level. The user first accesses the system at the Applications level from the Additional Outputs screen. By selecting the Advanced option under Selected Devices, the user accesses the Printer Properties dialog box and proceeds with the configuration procedure as explained below.

An additional procedure is required to configure the Sony UP-D897 Printer. This is described in Configuring the Sony UP-D897 Printer on page 3 - 50.

1.) On the system console, press **Config** and select **Connectivity**.

2.) From the **Additional Outputs** screen under **Selected Devices**, select **Advanced...**

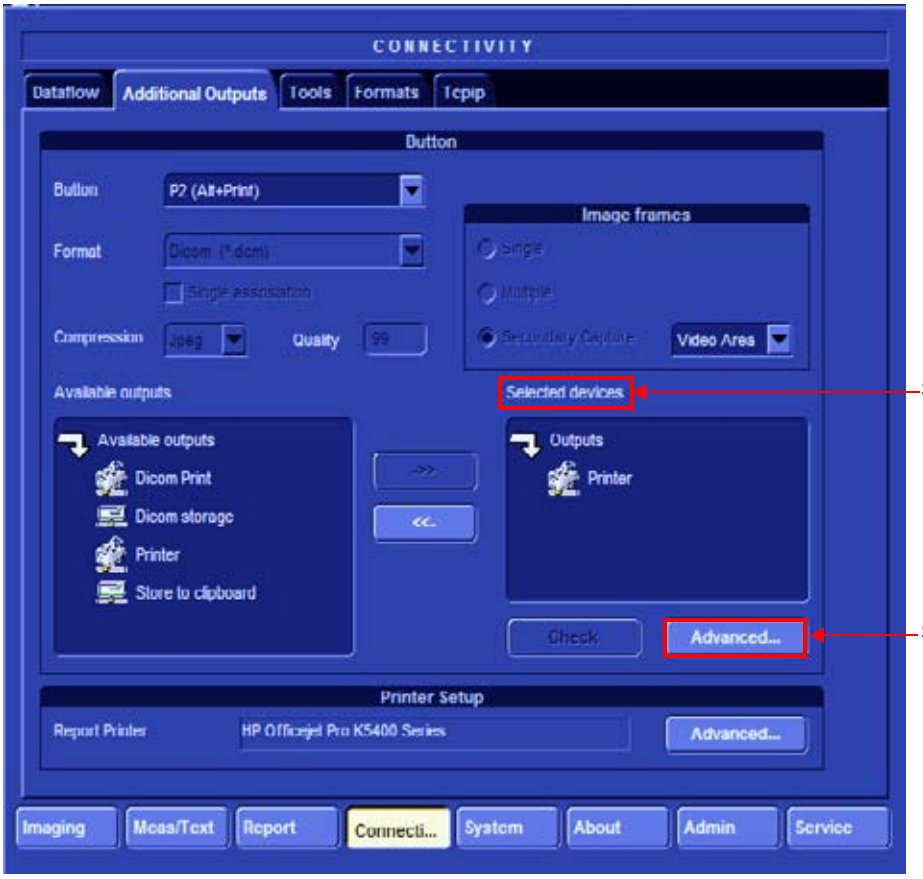


Figure 3-39 Advanced option at Windows level

3.) Click **Configure** in the **Printer Properties** dialog to enter Print Setup.

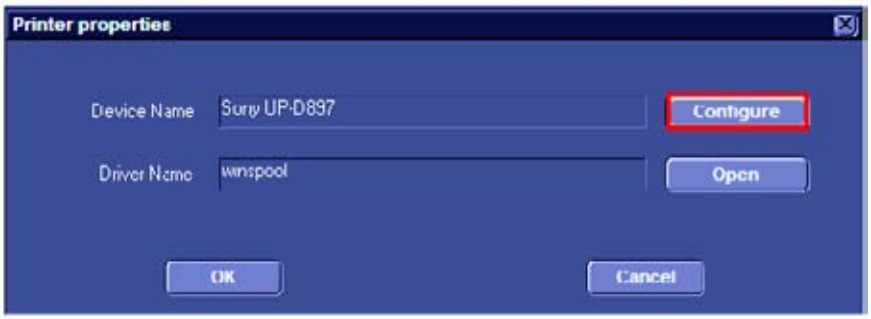


Figure 3-40 Printer Properties Dialog Box

4.) In the Orientation area, select **Portrait** or **Landscape** as needed.

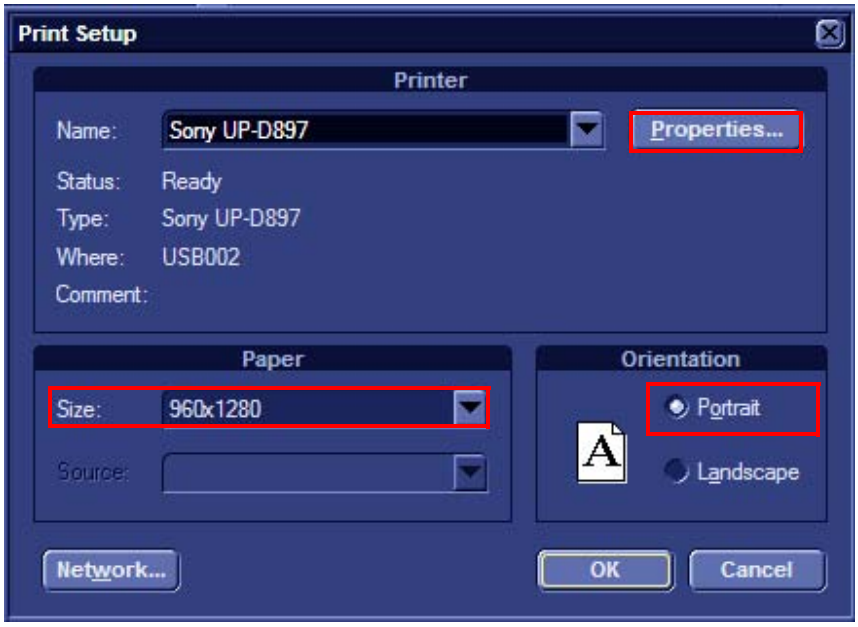


Figure 3-41 Printer Setup

5.) From the Paper Size drop-down list, select the required paper size.

6.) Click **Properties**. The printer properties screen opens - Figure 3-42.

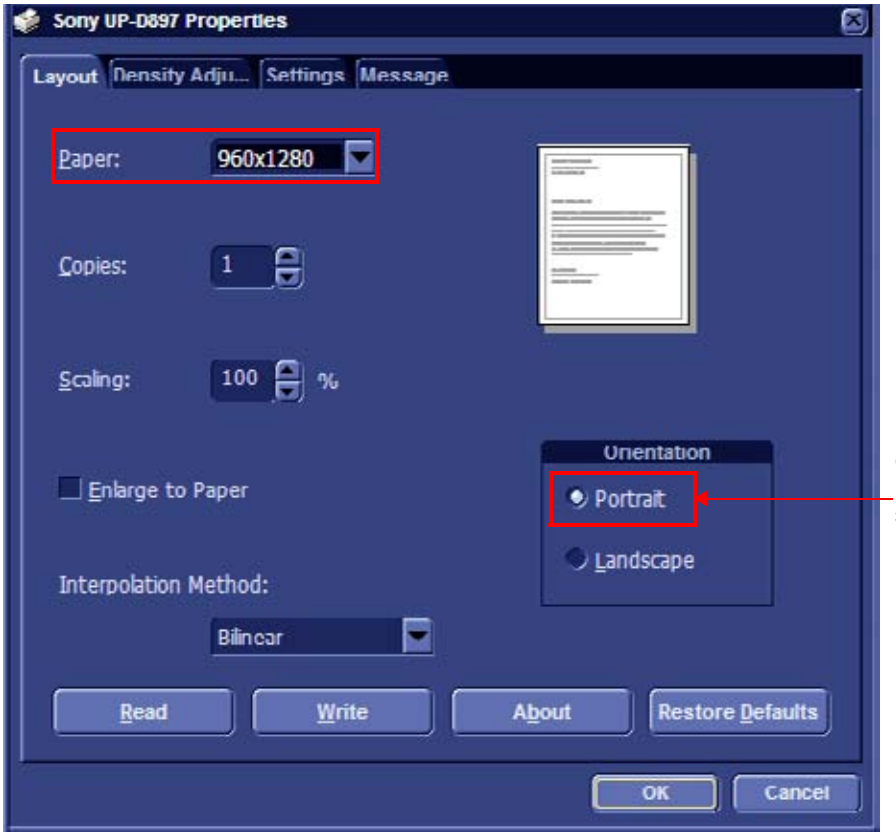


Figure 3-42 Printing Properties - Selecting Orientation

7.) Verify that the selected orientation and paper size are correct.

8.) Click **OK** twice and then once more to return to the **Advanced Outputs** tab.

3-5-1-14 Configuring the Sony UP-D897 Printer

To configure the Sony UP-D897 Printer, the following steps are required:

1.) Click the **Tcpip** tab on the Connectivity screen (see Figure 3-39 on page 3-47).

2.) Select **Advanced Settings** - see Figure 3-43.

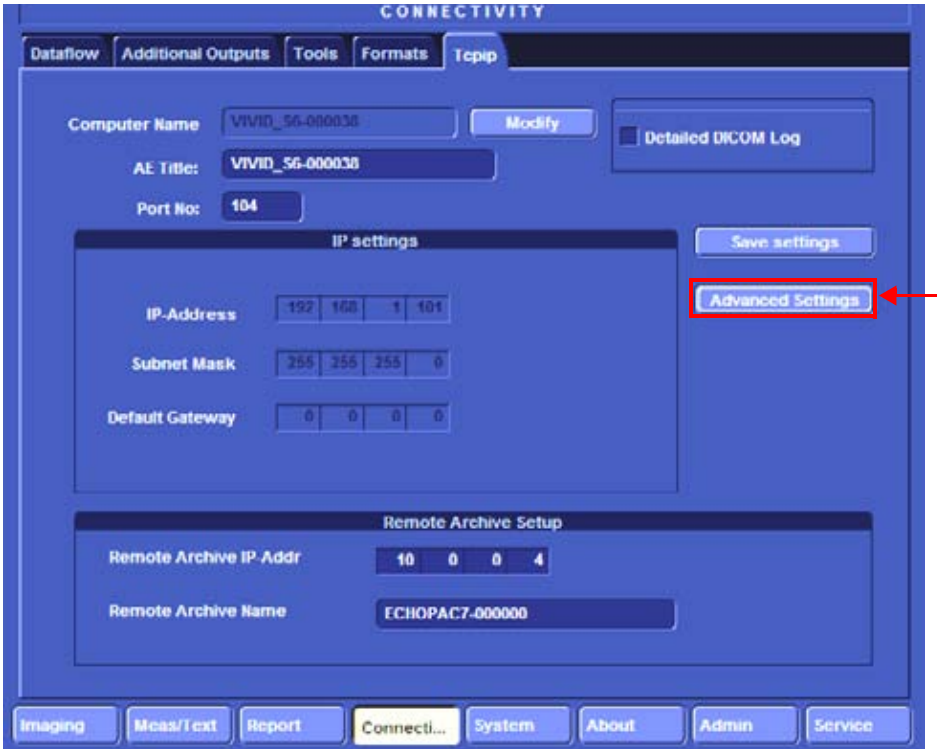


Figure 3-43 Tcpip screen

3.) The Network Connection screen opens (Figure 3-44). Click the "**Up**" button to open the Windows Control Panel.

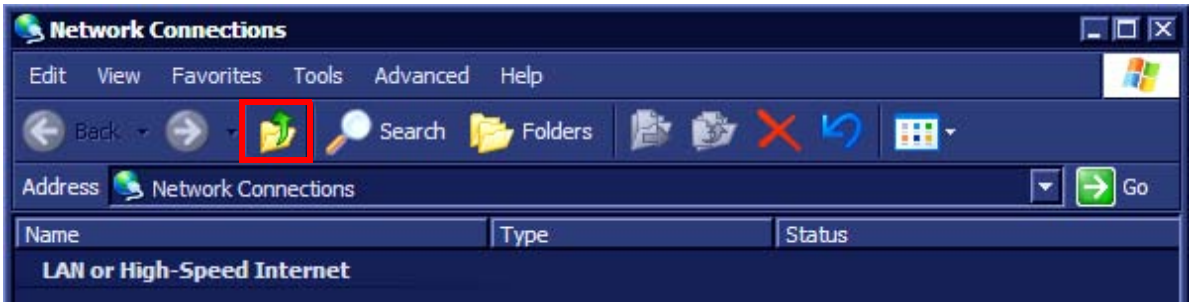


Figure 3-44 Network Connections showing highlighted "Up One Level" button

4.) Navigate to **Printers and Faxes** and double-click **Sony UP-D897** to open the Sony UP-D897 Printer Configuration dialog.

5.) From the menu, select **Printer** > **Properties**.

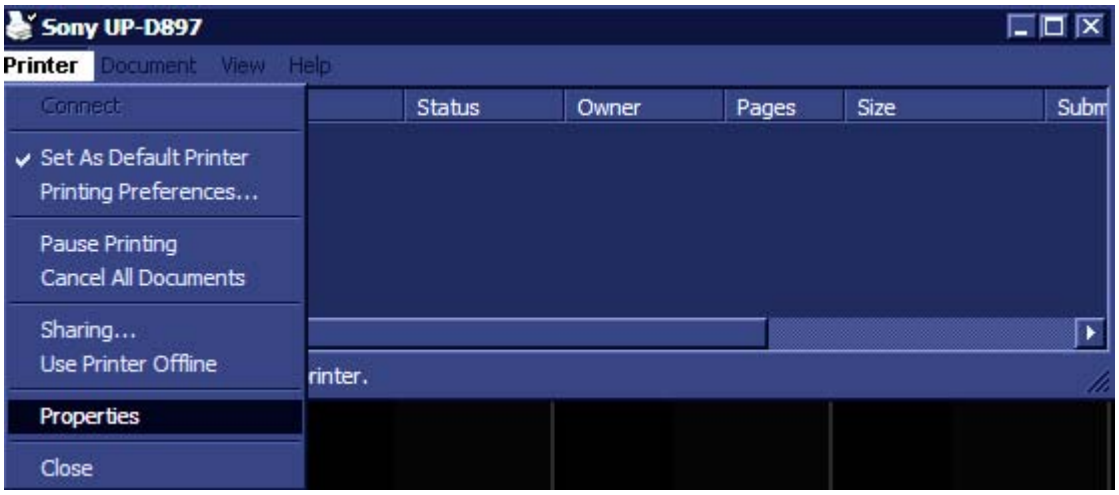


Figure 3-45 Sony UP-D897 printer configuration dialog box

6.) The Sony UP-D897 Properties screen opens. Select **Printing Preferences...**,

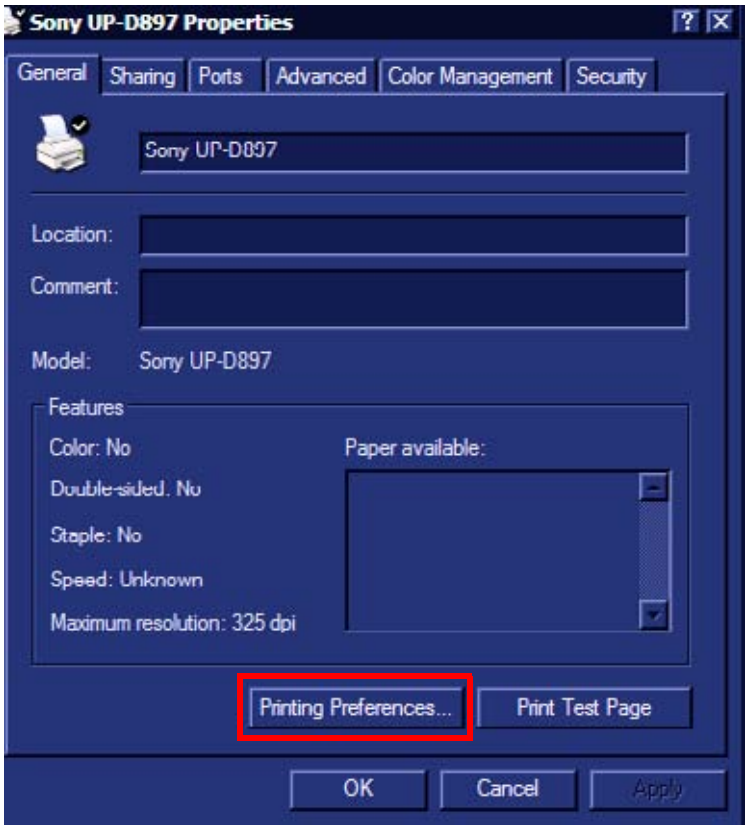


Figure 3-46 Sony UP-D897 Properties Screen

7.) From the **Printing Preferences** dialog, under Orientation:

A.) Under Paper, click the scroll-down arrow and select the required paper size.

B.) Under **Orientation**, choose the required printing orientation.

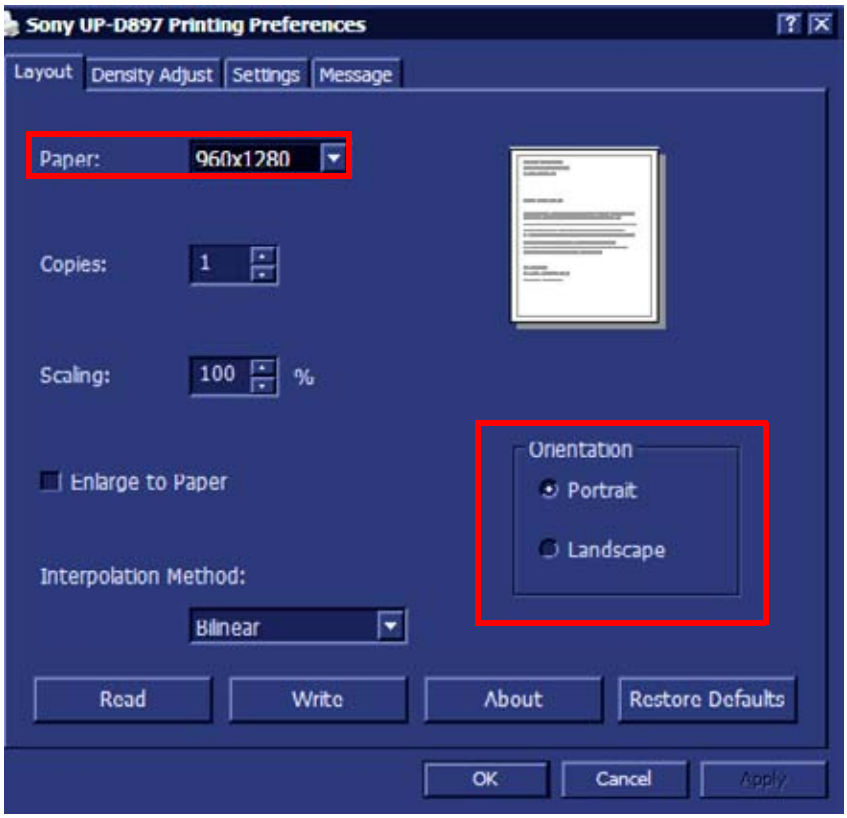


Figure 3-47 Printing Preferences screen

8.) Click **OK** and return to the Connectivity screen.

3-5-1-15 Connecting the VCR

Figure 3-48 Video Casette Recorder

There are two types of VCR - PAL or NTSC approved by GE Medical Systems.The VCR connection in the different scenarios is explained below.

- **Direct Connection to the Vivid-i™/ Vivid-q™ System**

A Mitsubishi VCR is used in this configuration - use the type that is suited to your region. The video signal is received through a VGA-to-video converter.

1) Connect one end of the VGA cable to the VCR OUTPUT located on the Vivid-i™/ Vivid-q™ rear connector panel (see note below).

Note: When performing step 1, it may be necessary to use the VGA adaptor (P/N 2420728 - see Figure 3-49) to connect the end of the VGA cable to the Vivid-i™/ Vivid-q™ rear connector panel.
Since some VGA plugs have thicker housing, they do not fit properly into the Vivid-i™/ Vivid-q™ VGA connector socket on the rear panel (because the plug is not centrally aligned within the frame). In this event, use of the VGA adaptor will eliminate the possibility of causing damage to the BEP by the use of unnecessary force.

Figure 3-49 VGA Adaptor

2) Connect the other end of the VGA cable to the VGA INPUT on the video converter - see Figure 3-50.

Figure 3-50 Video Converter

3.) Connect one end of the S-Video cable to the S-Video OUTPUT on the video converter.

4.) Connect the other end of the S-Video cable to the VCR S-Video INPUT at the rear of the VCR.

Note: Dip switches are located beneath the video converter, as shown in Figure 3-51 below.

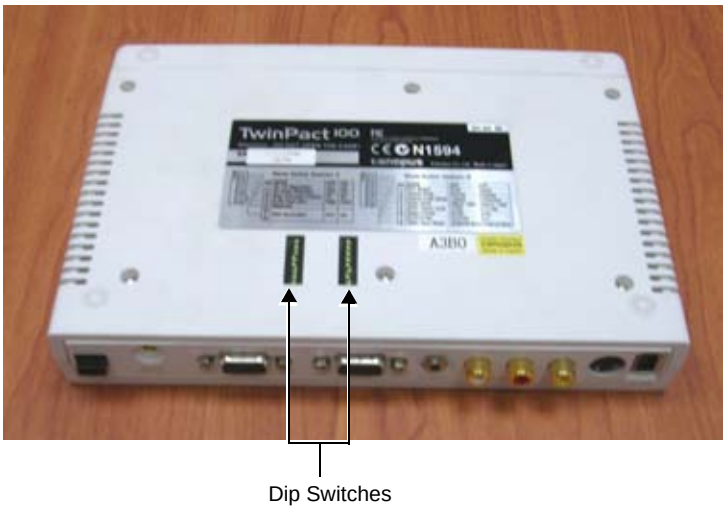


Figure 3-51 Video Converter Dip Switches

5.) Follow the manufacturer's guidelines to set the switches to the correct positions, as shown in Figure 3-52 on page 3-54.

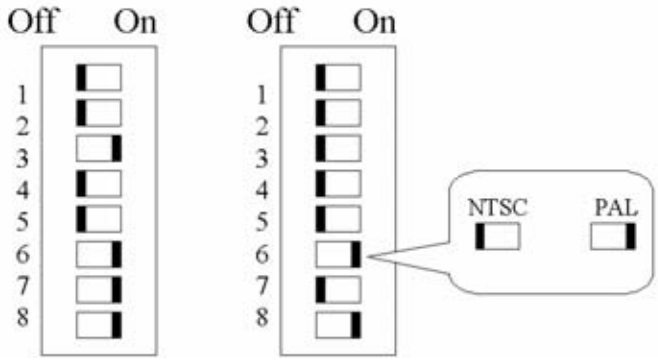


Figure 3-52 Video Converter Dip Switch Positions

6.) When all power and signal cables are connected to the system, VCR, and video converter, proceed as follows (**in the order stated**):

a.) Press the power ON switch on the VCR.

b.) Press the power ON switch on the video converter.

c.) Turn ON power to the Vivid-i™/ Vivid-q™ system.

7.) Press the **Input Select** button (see Figure 3-50 on page 3-53) on the video converter *three* times in order to select VGA Input as your signal source.

The LED located on the video converter front panel will be illuminated, accordingly.

8.) Press on the three buttons <**CTRL**> <**ALT**> <**Page Erase**> simultaneously.

The following screen will appear.

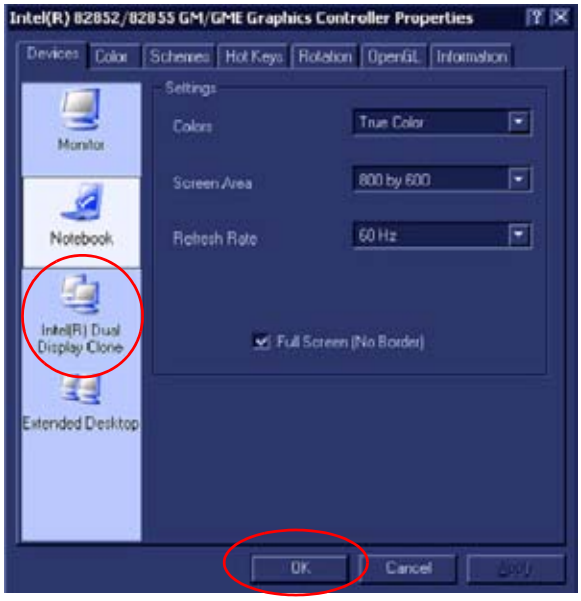


Figure 3-53 Intel® Dual Display Clone

9.) Select the **Intel® Dual Display Clone** icon and press **OK -** see Figure 3-53

NOTE: If the VGA cable is not properly connected to the rear panel, or in the event that the scan-converter device is not switched ON, you may see a single icon displayed, as shown in Figure 3-54.

Figure 3-54 Single Icon

10.) Confirm Desktop Change by clicking **OK**.

The dialog box will be closed and the VGA output will become activated, see Figure 3-55

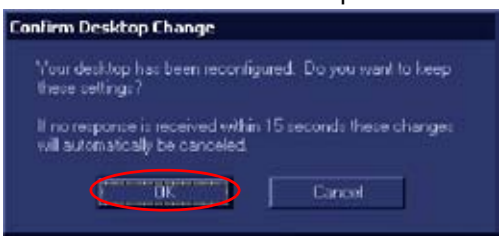

Confirm Desktop Change
Your desktop has been reconfigured. Do you want to keep these settings?
If no response is received within 15 seconds these changes will automatically be canceled.
OK
Cancel

Figure 3-55 Confirm Desktop Change

NOTE: When the VGA cable is disconnected and reconnected while the system is ON, the VGA output is maintained.

NOTE: If system is shut-down to standby or Full-shut-down while the VGA device is connected continuously, the VGA output will appear after the system is turned ON

NOTE: If the system is shut-down to Standby or Full-shut-down and the VGA device is disconnected, the VGA output will not appear after power is turned ON, and the above procedure will have to be repeated.

- Vivid-i™/ Vivid-q™ mounted on SafeLock Cart

  A Mitsubishi VCR is used in this configuration - use the type that is suited to your region. The VCR must be powered using one of the peripheral power outlets available on the cart. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the cart.

  It is possible to use a different type of VCR (brand and model). However, it is highly recommended to use a medical-graded VCR as this will ensure that both safety and image quality levels meet universal medical standards.

1) Connect one end of the VGA cable to the VGA OUTPUT located on the Vivid-i™/ Vivid-q™ unit (refer to Figure 3-13 on page 3-22).
2.) Connect the other end of the VGA cable to the VGA input on the video converter.
3.) Connect one end of the S-Video cable to the video converter S-Video OUTPUT (refer to Figure 3-50).
4.) Connect the other end of the S-Video cable to the VCR S-Video INPUT at the rear of the VCR.
5.) Follow the manufacturer's guidelines to set the video converter dip switches to the correct positions (refer to Figure 3-52 on page 3-54).
6.) When all power and signal cables are connected to the system, VCR, and video converter, proceed as follows (**in the order stated**):
   a.) Press the power ON switch on the VCR.
   b.) Press the power ON switch on the video converter.
   c.) Turn ON power to the Vivid-i™/ Vivid-q™ system.
7.) Press the **Input Select** button (see Figure 3-50 on page 3-53) on the video converter *three* times in order to select VGA Input as your signal source.

   The LED located on the video converter front panel will be illuminated, accordingly.
8.) Proceed to perform the VCR Test on page 4 - 29.

3-5-1-16 Connecting the VGA Splitter

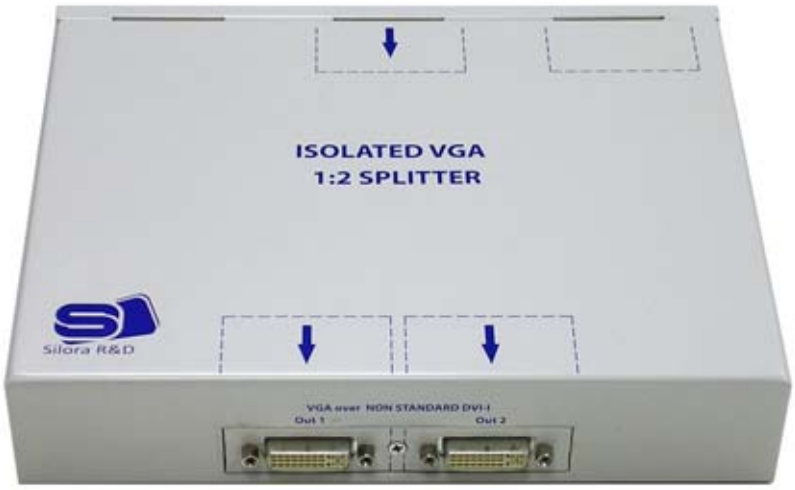


Figure 3-56 VGA Splitter

Power Cable

VGA Cable

DVI Cables

Figure 3-57 Cables and Bracket for Wall Mounting

NOTE: Vivid-i™/ Vivid-q™-to- Carto3 VGA Cable Installation:
A GE Field Service Engineer must be present when connecting the VGA cable (top right in Figure 3-57)

between the Vivid-i™/ Vivid-q™ system and the GE Video Splitter/Isolation box.

1.) Connect the VGA cable (Figure 3-57) to the VGA input port at the rear of the VGA splitter (see Figure 3-58 and Figure 3-59).

Connect the other end of the cable into the Vivid-i™/ Vivid-q™ system's VGA output port.

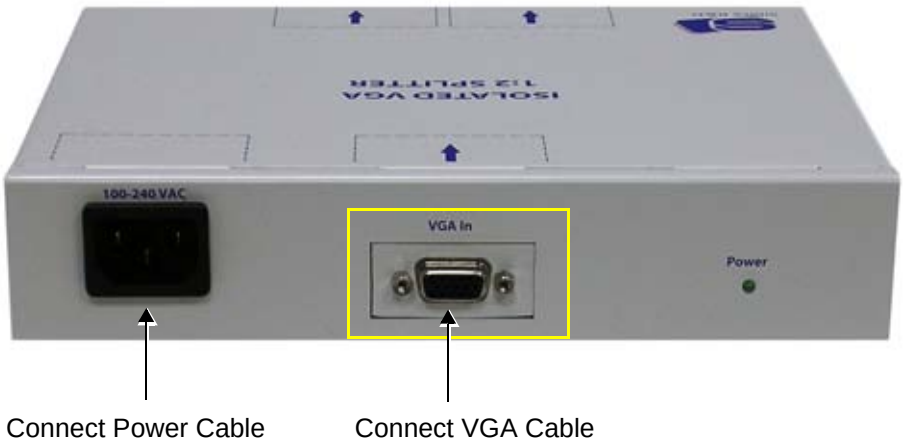


Figure 3-58 VGA Splitter - Rear View

2.) Plug the VGA Splitter power cable (Figure 3-57) into the power socket on the rear of the VGA Splitter (see Figure 3-58 and Figure 3-59).

Plug the other end of the power cable into the mains power wall outlet.

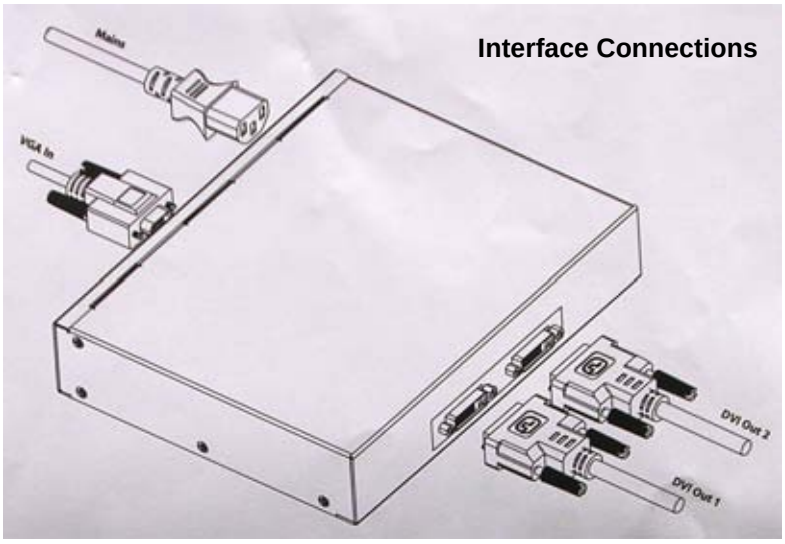


Figure 3-59 Connections to VGA Splitter

3.) Connect the necessary DVI cables (Figure 3-57) to the VGA Splitter DVI output ports (as required for further connection to other DVI devices). Refer to Figure 3-59, above.

4.) When connecting the DVI output cable to an external monitor, press **V-Out** on the Vivid-i™/ Vivid-q™ system console.

The screen shown in Figure 3-60 is displayed:

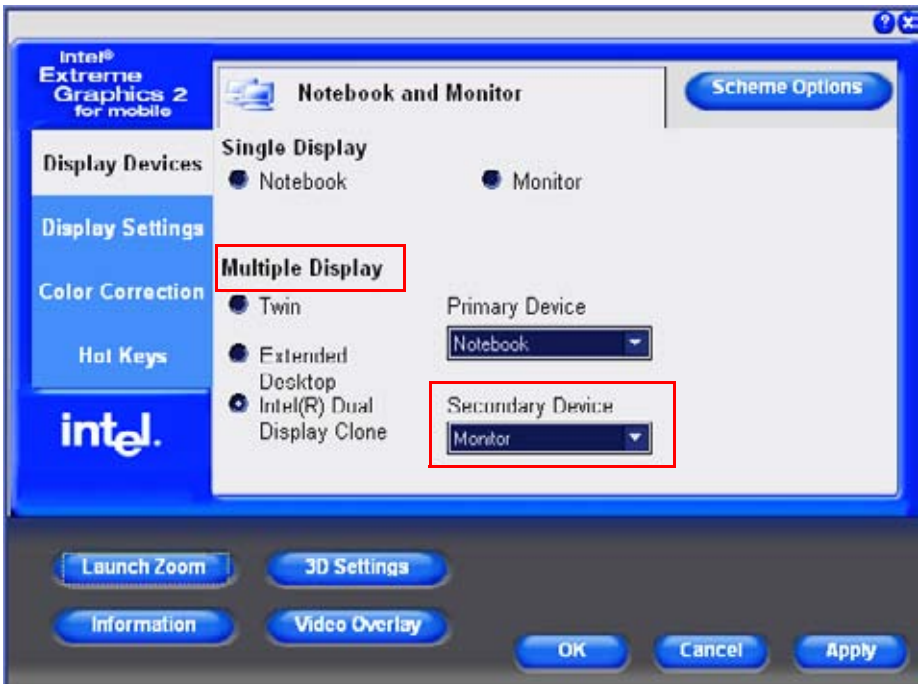


Figure 3-60 Selecting Dual Screen Display Option

5.) Under **Multiple Display**, activate the **Intel(R) Dual Display Clone** radio button.

Monitor is now selected as the Secondary Device, as shown in Figure 3-60.

3-5-2 Charging the Battery

NOTE: The CH5000GE is a stand-alone desktop smart-battery charger with the added ability to recalibrate the fuel gauge when detected to be out of calibration. The charger is specifically designed to operate with the Vivid-i™/ Vivid-q™smart-battery (P/N 2378963-2).

The charger is supplied in a carton containing the following items:

- CH5000 desktop charger/calibrator
- 24V 2.5A AC-adapter power supply, universal mains input
- Instruction Manual

CAUTION: Always observe the following safety precautions:

- Do not expose the charger or power supply to water or conductive liquids (this is not a sealed case).
- Do not open the charger or power supply case. There are no user-serviceable parts inside.
- Do not cover the fan exhaust or obstruct the airflow, as this will cause overheating.
- Use only the manufacturer's 24V 2.5A power supply.
- Place the charger in a cool location, away from external heat sources.
- During recalibration, the battery connector and base of the charger may become warm.

3-5-2-1 Setting up the Charger

1) Place the charger unit on a flat, level surface away from sources of heat and moisture.

2) Plug the DC connector from the power supply into the back of the charger.

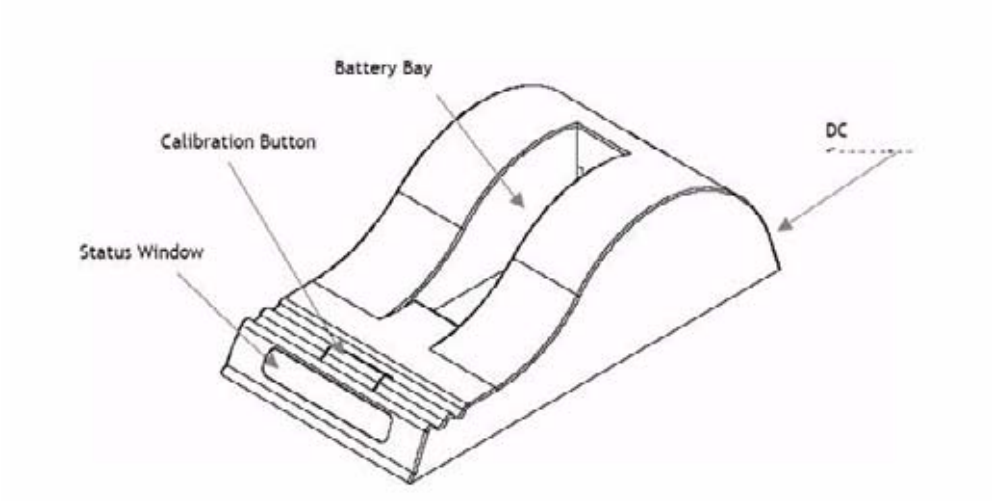


Figure 3-61 Battery Charger Unit

3.) Connect the power supply to the mains AC supply, using the cable supplied.

3-5-2-2 Charging the Battery

1) Place the battery into the battery bay making sure that the 5-way connector is fully seated.

The LEDs in the status window (see Figure 3-61) will provide status information as detailed in Table 3-1 below, and the charger will automatically begin to charge the battery.

LED Indicator		Status
	Green Flashing	Battery charging
	Green Solid	Battery fully charged
	Blue flashing	Battery in Calibration mode
	Blue Solid	Battery fuel gauge calibrated
	Red Flashing	Battery fuel gauge in need of recalibration
	Red Solid	Error

Table 3-1 Battery Charger LED Indicators and Status

- **Recharge Time**:

  The time for a full charge from 0% to 100% state of charge is typically 4.5 hours.

- Recalibration Time

  The recalibration cycle begins by discharging away any residual capacity. Then a calibration charge is delivered to the battery. This is followed by a calibration discharge. Finally the battery is given a regular charge. A calibration cycle will be faster if the battery is fully discharged to begin with.

  The recalibration time is approximately 9 hours for an empty battery, and approximately 14 hours for a fully-charged battery.

Note: Calibration is initiated each time the button is pressed, so it is not recommended to press the recalibration button part way through the recalibration cycle.

During the charging procedure, the green LED will be seen flashing.

At the end of this procedure, when the battery is fully charged, the solid green LED will be illuminated in the status window, indicating a fully charged battery.

2.) Remove the battery from the charger unit battery bay and install it in the Vivid-i™/Vivid-q™ portable ultrasound scanner.

3-5-2-3 Battery Recalibration

NOTE: For more details on recalibration and an explanation of why it is necessary, refer to Recalibration on page 5 - 82.

If the battery is in need of “fuel gauge” recalibration, the red LED will flash upon insertion of the battery. This indicator provides feedback to the user on the accuracy of the fuel gauge and avoids unnecessary battery calibration cycles.

The user has the option to calibrate the fuel gauge and charge the battery, or to only charge the battery. This option is given because a recalibration cycle is longer than a charge cycle.

1) To recalibrate the battery, press the calibrate button on the front of the battery charger unit.

   No action is required if only a recharge is required, as the charger will automatically begin to charge the battery.

   The blue calibration LED will flash to indicate that the battery is undergoing the recalibration cycle.

   There may be a short delay before the calibration begins. During calibration the discharge resistors will heat up and the fan will operate to maintain temperature within acceptable limits.

   At the end of this procedure, when the battery is fully charged and the battery fuel gauge is calibrated, the solid green and blue LEDs will be illuminated in the status window, indicating a fully charged, fully calibrated battery.

2.) Remove the battery from the charger unit battery bay and install it in the Vivid-i™/Vivid-q™ portable ultrasound scanner.

Note: The most common cause of calibration failure is overheating of the pack during discharge. For this reason, keep the charger away from direct sunlight or heat sources.

3-5-3 Connecting Probes

The Vivid-i™/ Vivid-q™ ultrasound unit operates with various types of probes that are used for scanning patients, including flat phased, convex and linear electronic array probes. Once connected, the probes can be selected for different applications.

Probe connectors on the Vivid-i™/ Vivid-q™ unit are as follows:

- Two active probe connectors (one for a pencil probe) on the *right* side of the unit

Probes can be connected or changed any time, as described below, regardless of whether the system is powered ON or OFF.

CAUTION: Handle the probe gently while connecting and disconnecting**.**
Do NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.

1) Place the probe's carrying case on a stable surface and open the case.
2) Inspect the probe socket to verify that it is free of debris.
3) Carefully remove the probe and unwrap the probe cord.
   DO NOT allow the probe head to hang freely. Impact to the probe head could result in irreparable damage.
4) Press the probe connector locking lever *downwards* (refer to Figure 3-62).

Figure 3-62 Probe Connection Locking Lever

5) Align the connector with the probe port and carefully push into place, as shown in Figure 3-63.

Figure 3-63 Connecting Probe to the Vivid-i™

6) Press the connector locking lever *upwards* to the full vertical position to lock in place, as shown in Figure 3-64.

Figure 3-64 Securing Probe with Locking Lever

7) Carefully position the probe cord so that it is free to move and is not resting on the floor.

When the probe is connected, it is automatically activated.

CAUTION: Do not bend the probe cable acutely.
Fault conditions can result in electric shock hazard. Do not touch the surface of probe connectors which are exposed when the probe is removed. Do not touch the patient when connecting or disconnecting a probe.

NOTE: It is not necessary to turn OFF power to connect or disconnect a probe.

3-5-3-1 Available Probes

The following probes are available for use with the Vivid-i™/ Vivid-q™ ultrasound unit.

Table 3-2 Vivid-i™/ Vivid-q™ Available Probes

P/N	Probe
H40452LH	M4S-RS
H4000PD	3S - RS
H4000PC	5S-RS
H45021RP	6S-RS
H4000PE	7S - RS
H4000PF	10S -RS
H45531YM	9T - RS
H45551ZE	6Tc-RS
H45021C	P2D-RS
H45021CA	P6D-RS
H40402LT	8L-RS
H40442LL	9L-RS
H40402LY	12L-RS
H4000SR	4C-RS
H40402LS	8C-RS
H40402LN	e8C-RS
H40402LW	i12L-RS
E8385MZ	GE M4S/3S Probe Sterile Multi-Angle Biopsy Starter Kit
E8385NA	4C-RS Biopsy Kit
E8385N	8L-RS Biopsy Kit
H4906BK	9L-RS Biopsy Kit
H40432LC	12L-RS Biopsy Kit
E8385MJ	e8C Biopsy Kit, single angle, disposable
H45031DS	RS Probe Holder 3S, 5S, 7S

Table 3-2 Vivid-i™/ Vivid-q™ Available Probes (cont'd)

P/N	Probe
H45531HS	Bite Hole Indicator
H45551NK	TEE Cleaning and Storing system
H45551NM	TEE Storage Rack
H45511EE	TEE Clip-On Bite Guard Adult
H45521CB	TEE Clip-On Bite Guard Adult OR
H45521JG	TEE Conventional Bite Guard Pediatric
H45521JH	TEE Conventional Bite Guard Adult
H45521CK	Adult TEE Scanhead Protection Cover
H45541RN	Pediatric TEE Scanhead Protection Cover
H45021KP	TEE Probe Adaptor for 6T-RS/9T-RS
H45021YE	ICEcord-RS

3-5-4 Connecting the ECG

NOTE: The ECG may be connected to the system at any time, whether the system is powered ON or OFF.

- To connect the internal ECG carefully push the end of the cable connector into the ECG connector port (circular-shaped socket on the left side of the system beside the probe connectors), as shown in Figure 3-65 below.

Figure 3-65 ECG Cables Connected to the ECG Connector Port

CAUTION: When disconnecting the ECG Cable from the Vivid-i™/ Vivid-q™, ***do not pull on the cable directly***. Carefully remove the cable by holding the outer sleeve (closest to the system) while releasing the cable.

The same connector is used both for external and internal ECG. The appropriate ECG cable kit should be ordered when external ECG is to be used.

See also information on Ext-ECG Module Connector provided in ECG Module on page 5 - 39.

Note: For optimal ECG operation, use only electrodes that meet universal standards - see Table 3-3.

Table 3-3 ECG Cable Types

Description	Part No.
Full ECG Cable Kit - AHA (Americas) Black lead (LA) White lead (RA) Green lead (RL)	2418831-2
Full ECG Cable Kit - IEC (Europe, Asia, ROW) Yellow lead (L) Red lead (R) Black lead (N)	2418832-2

Use of the External Respiratory option is enabled by installation of the Internal ECG/Respiratory Board. For instructions, refer to the ECG/Respiratory Module Assembly Installation Procedure on page 8 - 24.

NOTE: An External ECG (Respiratory) cable should be available. This is provided by GE HealthCare (Part # 2413451 - see Figure 9-18). Alternatively, the adaptor supplied with the GE cable may be used to adapt an existing cable - refer to the optional connections for the External Respiratory interface illustrated in Figure 5-34 on page 5-43.

3-5-5 Connecting the Unit to a Power Source

The connection of the Vivid-i™/ Vivid-q™ ultrasound unit to a power source should be performed by a qualified person who has completed basic Vivid-i™/ Vivid-q™ System User Training. Use only the power cords, cables and plugs provided by or designated by GE Medical Systems to connect the unit to the power source.

CAUTION: Verify compliance with all electrical and safety requirements and check the power cord to verify that it is intact and of hospital-grade before connecting the unit to the power source. Products equipped with a power source (wall outlet) plug should be connected to the fixed power socket that has a protective grounding conductor. Never use an adapter or converter to connect with a power source plug (for example, a three-prong to two-prong converter).

3-5-5-1 Voltage Level Checks

The following voltage level checks are required whenever the Vivid-i™/ Vivid-q™ system is used with the SafeLock Cart:

1) Check the rating label at the rear of the SafeLock Cart, as described in *Chapter 1 - Introduction*, and verify that your local AC Voltage corresponds to the voltage setting as indicated on the rating label. The rating label indicates that the factory preset input AC voltage is one of the following:
   - 100 V - 120 V AC
   - 220 - 240 V AC
2) Verify the maximum power requirement as follows:
   - Maximum power = 250 Va (the system, SafeLock cart and peripherals might need)
   - 100 - 120 V AC, 50-60 Hz 2.5A
   - 220 - 240 V AC, 50-60 Hz 1.25A

DANGER: ***Failure to provide an adequate earth circuit (Ground) may cause electrical shock and serious injury!***

3-5-5-2 Connecting the Ultrasound Unit to the Electrical Outlet

DANGER: To avoid the risk of fire, power to the system must be supplied from a properly rated outlet. It is recommended to use a dedicated power outlet. The power plug should not, under any circumstances, be altered to a configuration rated less than that specified for the current. DO NOT use an extension cord or adaptor plug. Refer to the *Electrical Requirements* section, on page 2-3 for more details.

NOTE: It is recommended to connect the AC-DC converter to the ultrasound unit first, before connecting it to the AC wall outlet.

3-5-5-3 Disconnecting the Ultrasound Unit from the Electrical Outlet

CAUTION: Make sure the system is powered OFF or in standby mode before disconnecting the Vivid-i™/ Vivid-q™unit from the electrical outlet and proceed as described in the steps below:

1) Unplug the mains power cable connector from the AC input socket on the SafeLock Cart or the AC-DC converter of the system.
2) Unplug the mains power cable from the AC wall outlet socket.
3.) Unplug the AC/DC power connector from the Vivid-i™/ Vivid-q™ rear panel.

3-5-6 Switching the System ON/OFF

3-5-6-1 Switching the System ON

1) Verify that the ultrasound unit has been connected to the power supply and that the circuit breaker is ON (if the system is being used on the SafeLock Cart), as described in the *Connecting the Ultrasound Unit to the Electrical Outlet* section, on page 3-67.

NOTICE When AC power is applied to the scanner, the **On/Off** button on the control console illuminates amber, indicating the Back-end Processor is in *Standby* mode.

2) Hold down the **On/Off** button on the control panel for 3 seconds. The system automatically performs an initialization sequence which includes the following:
   - Loading the operating system.
   - Running a quick diagnostic check of the system.
   - Detecting connected probes.
3) When prompted, log in to the system as appropriate.
   (Refer to the instructions for system login and user security setup as described in the Vivid-i™/Vivid-q™ User Manual).

The system first enters 2D-Mode with the probe and application that were last used before the system was shut down. If the probe has been removed since the system was last used, the currently-connected probes and their available applications are displayed and selected by default.

3-5-6-2 Switching the System OFF

NOTE: After turning OFF the system, wait at least 10 seconds before turning it on again. The system may not be able to boot-up if power is recycled too quickly.

The system can be switched OFF in one of three ways, as follows:

- Holding down the **On/Off** button for 3-5 seconds will evoke the display of the System Exit dialog box (see Figure 3-66). From this, you can either select *Full Shutdown* (click the **Shutdown** button)

or choose to place the system in *Standby Mode* (click the **Standby** button).

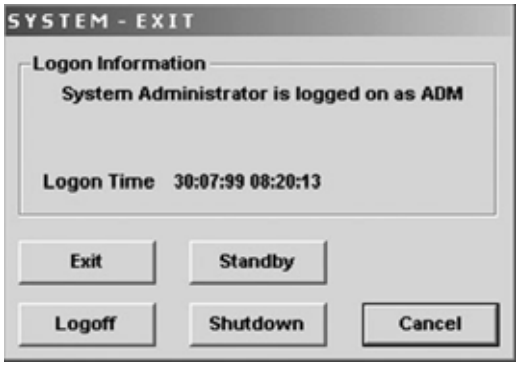


Figure 3-66 System Exit Dialog Box

- Holding down the **On/Off** button for more than 10 secs will cause the system to perform *Emergency Shutdown.* This is not recommended under normal circumstances.
- Closing the lid will place the system in *Standby Mode*.

Note: The system will remain in *Standby Mode* for as long as battery power will allow.

3-5-7 Service Dongle - Technical Support Mode

When a service dongle (technical support plug) is used, it is possible to exit into *Technical Support Mode* by either pressing the **On/Off** button for 3-5 seconds and then clicking the **Exit** button in the System Exit dialog box (refer to Figure 3-66), or by performing one of the procedures described below.

3-5-7-1 Entering Technical Support Mode During Boot-up

1) Plug the service dongle in one of the USB ports.

   During boot-up, the system detects the dongle and then displays the Maintenance Access dialog box, as shown below.

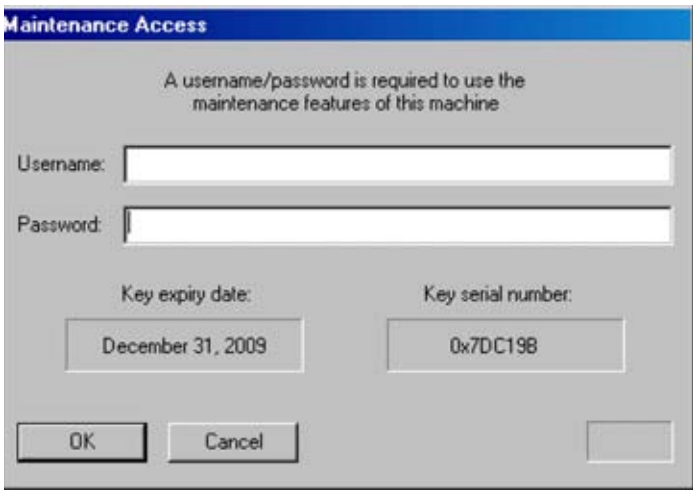


Figure 3-67 Maintenance Access Dialog Box

2) Leaving the User Name field empty, type the current GE service password in the **Password** field.

3) Click **OK**.

The following important message is displayed:

READ THIS NOTE BEFORE CONTINUE:
After you have pressed OK, the Start Application dialog will be displayed on screen. Be ready to *press* MAINTENANCE... *before the Time Bar is "full", or the Vivid-i™/ Vivid-q™ application software will be started. (A description on how to recover, if you fail to click* MAINTENANCE *is included, but you will spend extra time doing this).*

4) After reading the message, click **OK**.

The Start Application dialog box is displayed

5.) Click the **Maintenance** button to enter *Maintenance Mode*.

The Maintenance dialog box is displayed:

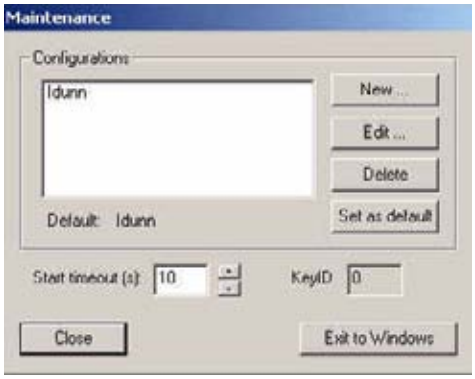


Figure 3-68 Maintenance Dialog Box

6.) Click the **Close** button.

The message "*Exit to Windows or Start?*" is displayed.

7.) Select **Start**.

The application starts and the Start Application dialog box is displayed, as shown above.

3-5-7-2 Entering Technical Support Mode when System is Powered ON - Procedure 1

NOTE: Follow these steps if you want to exit to the Windows Desktop when the Vivid-i™/ Vivid-q™ application is active. The Service Dongle must be plugged in to one of the USB ports.

1.) On the Alphanumeric Keyboard, press <**Ctrl**>+**Alt**+**R**.

This will display either the Start Application dialog box (continue with step 2), or the Maintenance dialog box (continue with step 3).

2.) If the Start Application dialog box is displayed, click **Maintenance** to enter *Maintenance Mode*.

This will display the Maintenance dialog box.

3.) In the Maintenance dialog box, select **Exit to Windows**.

This will display the Windows Desktop on the screen.

3-5-7-3 Entering Technical Support Mode when System is Powered ON - Procedure 2

NOTE: The Service Dongle must be plugged in to one of the USB ports.

1.) On the Alphanumeric Keyboard, press **On/Off** button for 3-5 secs.
When System Exit dialog box appears (refer to Figure 3-66 on page 3-69), click the **Exit** button.

This will display either the Start Application dialog box (continue with step 2), or the Maintenance dialog box (continue with step 3).

2.) If the Start Application dialog box is displayed, click **Maintenance** to enter *Maintenance Mode*.

This will display the Maintenance dialog box.

3.) In the Maintenance dialog box, select **Exit to Windows**.

This will display the Windows Desktop on the screen.

Section 3-6
Mounting the Vivid-i™/ Vivid-q™ on the SafeLock Cart (optional)

NOTE: The Vivid-i™/Vivid-q™ portable ultrasound scanner may be mounted on the SafeLock Cart while power to the system is either ON or OFF. When mounting the unit on the cart, it may be necessary to adjust the locking mechanism, as described in
Adjusting the SafeLock Cart Locking Mechanism on page 3 - 73.

NOTICE Only the SafeLock Cart supplied by GE Ultrasound and/or any medical-grade cart which has been approved as suitable for use with the system by GE Ultrasound should be used with the Vivid-i™ or Vivid-q™ portable ultrasound scanner.

NOTICE The Vivid-i™/ Vivid-q™ system and the SafeLock Cart should be operated at a distance of more than 15 feet from any magnetic field.

3-6-1 Mounting the Vivid-i™/ Vivid-q™ on the SafeLock Cart

WARNING *Before mounting the Vivid-i™/Vivid-q™ portable ultrasound scanner on the SafeLock Cart make sure there are no foreign objects on the main shelf surface or in front of the locking tooth.*

1) Working from the front of the SafeLock Cart, place the Vivid-i™/ Vivid-q™ scanner flat down on the main shelf (towards the front) then slide it *backwards* between the sliding guides on either side of the shelf, as shown in Figure 3-69.

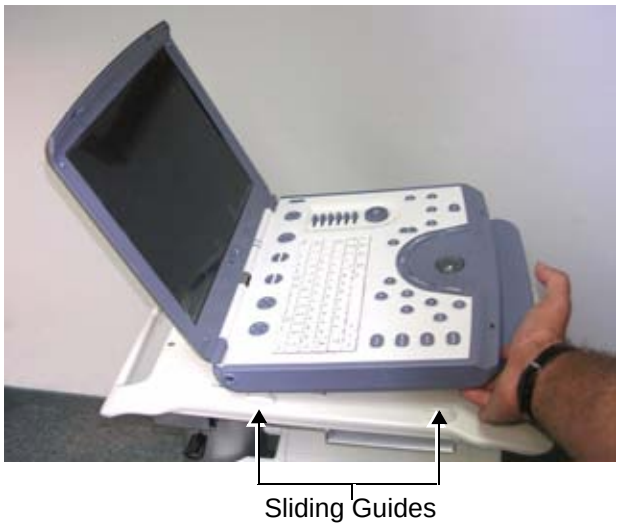


Figure 3-69 Placing the Vivid-q™ on the SafeLock Cart Main Shelf

2) Push the scanner down and *backwards*, until it locks into place against the locking tooth.

   An audible click will be heard as the scanner locks into position. There will now be a gap the width of one finger between the SafeLock Cart arm rest and the front of the scanner.

Figure 3-70 Vivid-i™ Scanner Mounted on SafeLock Cart

3) If necessary, perform the alignment procedure as described in Adjusting the SafeLock Cart Locking Mechanism, below.

4.) Connect the LAN Cable from the cart to the LAN connector on the Vivid-i™/ Vivid-q™ rear panel

(see Figure 3-71).

Figure 3-71 GE Healthcare - Global Ultrasound Rear Panel

5.) Connect the Docking Connector to the rear of the scanner, as shown in Figure 3-72 below.

Newer-type SafeLock Cart **Older-type SafeLock Cart**

Figure 3-72 Connecting the Docking Connector to the Rear of Scanner

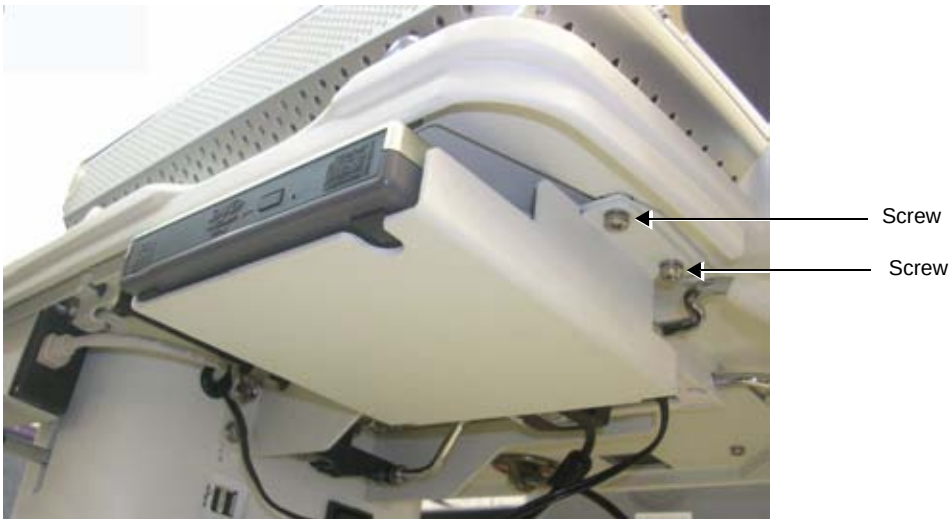
6.) Connect the USB Cable from the cart to the USB port on the Vivid-i™/ Vivid-q™ rear panel (see Figure 3-71). (use the *lower* port).

7.) If necessary, connect the DVD to the USB hub on the cart - refer to page 3-27.

3-6-2 Adjusting the SafeLock Cart Locking Mechanism

NOTE: The alignment procedure below is recommended in the event that when mounting the Vivid-i™/Vivid-q™ portable ultrasound scanner on the SafeLock Cart, the unit does not lock firmly in position when inserted into the safelocks. Alternatively, if when removing the unit from the Cart, it is difficult to disengage the safelocks.

1) Working from the *left* side of the SafeLock Cart, remove the DVD from the DVD/CD-RW device. Working from *underneath* the main shelf, loosen and remove the four screws (two each side) from the DVD/CD-RW device bracket, then remove the bracket and the device - see Figure 3-74.

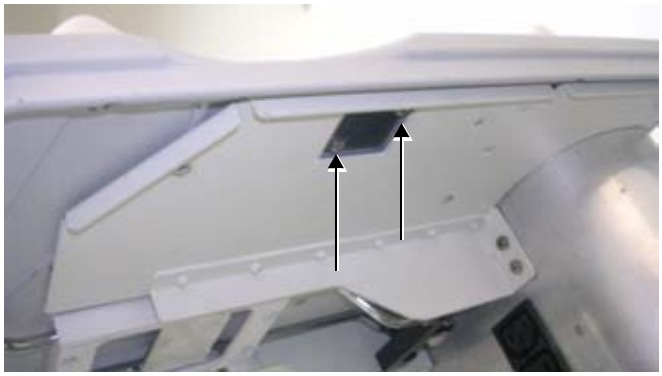


Note: only two screws visible in picture

Figure 3-73 DVD/CD Device and Bracket

2) Working from the *underneath* the main shelf, use a Phillips screwdriver to loosen the two screws (half turn counter-clockwise) holding the middle locking tooth in position on both the *left* and *right* sides of the main shelf, as shown in Figure 3-74.

Middle Locking Teeth Viewed from Top of Shelf



Screws Viewed from Beneath Shelf

Figure 3-74 Adjusting the SafeLock Cart Locking Mechanism

3.) Check that the Vivid-i™/Vivid-q™ portable ultrasound scanner is locked correctly onto the two rear locking teeth (if not, push the scanner fully back into position until an audible click is heard).

4.) Carefully tighten the four screws previously loosened in step 2.

5.) Reconfirm that the scanner is firmly locked into position and there is no excess play (movement) between the scanner and the Cart before returning the DVD/CD-RW device and bracket.

Section 3-7
Configuration

3-7-1 Overview

Table 3-4 below outlines the Vivid-i™/ Vivid-q™ Configuration procedures described in the relevant sub-sections.

Table 3-4 Configuration Procedures

SUB- SECTION	DESCRIPTION	PAGE NUMBER
3-7-2	*Vivid-i™/ Vivid-q™ Configuration*	3-75
3-7-2-2	*Enter Location*	3-76
3-7-2-3	*Date and Time Adjustments*	3-77
3-7-2-4	*Language Selection*	3-78
3-7-2-5	*Units of Measure*	3-80
3-7-3	*Service Screen Set-up*	3-81
3-7-4	*Configuring Peripherals*	3-87
3-7-4-1	*Approved Peripherals*	3-87
3-7-4-2	*Network Peripherals (Optional)*	3-87
3-5-3-1	*Available Probes*	3-64
3-7-5	*Software Options Configuration*	3-90

3-7-2 Vivid-i™/ Vivid-q™ Configuration

3-7-2-1 Preparations

Press **CONFIG** (**F2**) and log on as *Adm (see* Log On to the System as ADM on page 4 - 11).

3-7-2-2 Enter Location

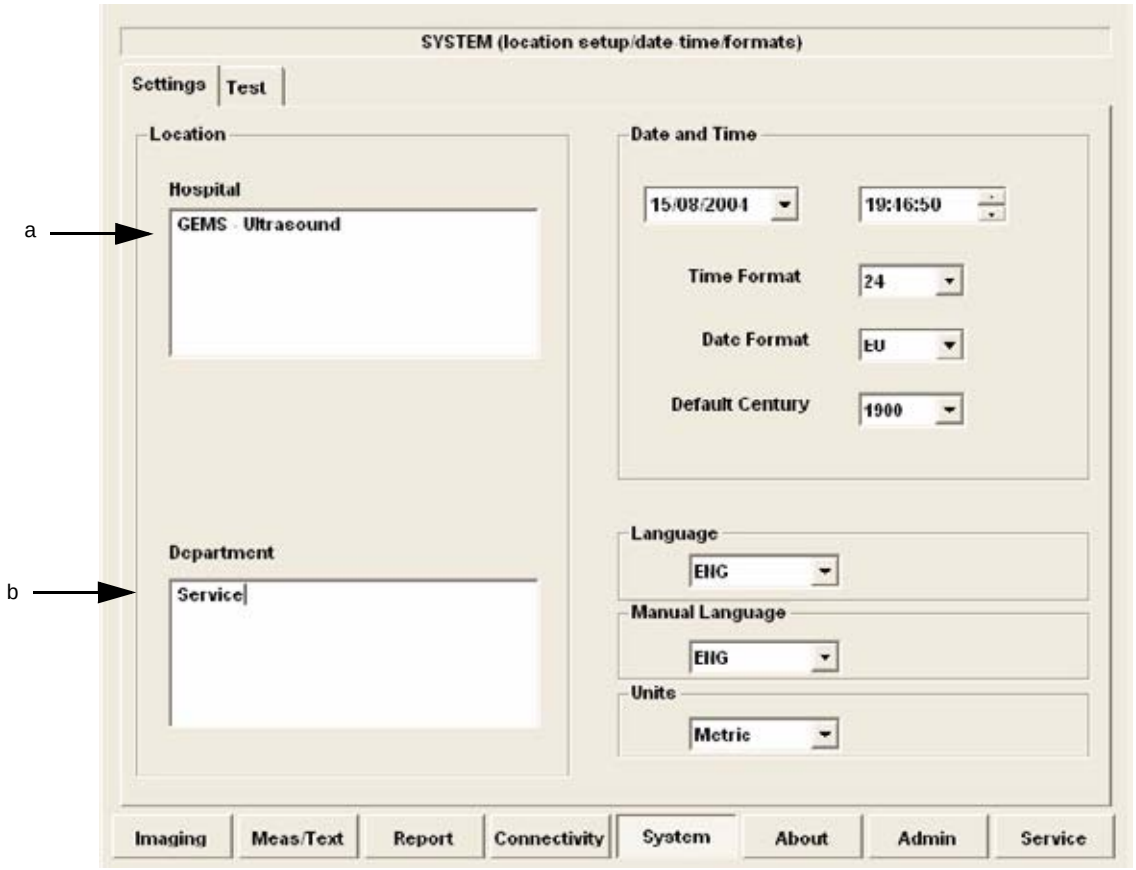


Figure 3-75 Hospital and Department Name

Table 3-5 Location Name

Step	Task	Expected Result(s)
1.	Open the Configuration Window, see Preparations. If needed, select SYSTEM.	*The System Settings Window is displayed.*
2.	Select the Hospital field, see (*a*) in Figure 3-75, and type the name of the hospital (max 64 characters).	The 24 first characters of this name are displayed on the scanning screen's title bar (after restart) All 64 characters are displayed on the image properties on saved images (after restart).
3.	Select the Department field, see (*b*) in Figure 3-75, and type the name of the department (max 64 characters).	This name will be displayed on the image properties on saved images as soon as the unit has been restarted.

3-7-2-3 Date and Time Adjustments

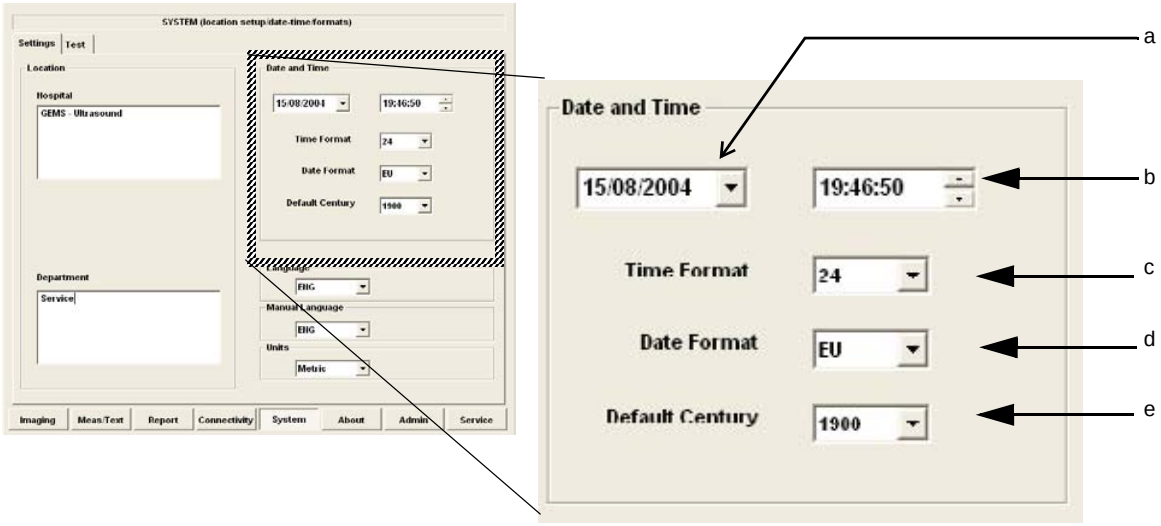


Figure 3-76 Date and Time Adjustments

NOTE: If the date and time displayed by the system are set to the BIOS default value, it may be necessary to replace the BIOS battery - see BIOS Battery Replacement on page 8 - 52.

Table 3-6 Date and Time Adjustments

Step	Task	Expected Result(s)
1.	Open the System (Configuration) Window, see Figure 3-75 on page 3-76. Select **SYSTEM**, if needed.	*The System Settings Window is displayed.*
2.	Adjust the date, see (*a*) in Figure 3-76.	New date is displayed
3.	Adjust the time, see (*b*) in Figure 3-76.	New time is displayed
4.	Select the preferred Time Format, see (*c*) in Figure 3-76.	**24:** the 24 hour format is used **12**: the 12 AM/PM hour format is used
5.	Select the preferred Date Format, see (*d*) in Figure 3-76. DD = Date (two digits) MM = Month (two digits) YYYY = Year (four digits)	**EU:** the European “DD.MM.YYYY” format is used **US:** the American “MM.DD.YYYY” format is used
6.	Select Default Century (1900, 2000 or None), see (*e*) in Figure 3-76.	**1900:** the number **19** is automatically displayed when entering the year in the patient date of birth. To edit century, press **BACKSPACE** twice. **2000:** the number **20** is automatically displayed when entering the year in the patient date of birth. To edit century, press **BACKSPACE** twice. **None:** the four digits have to be typed when entering the year in the patient date of birth. The selected setting will be used as soon as the unit has been restarted.

3-7-2-4 Language Selection

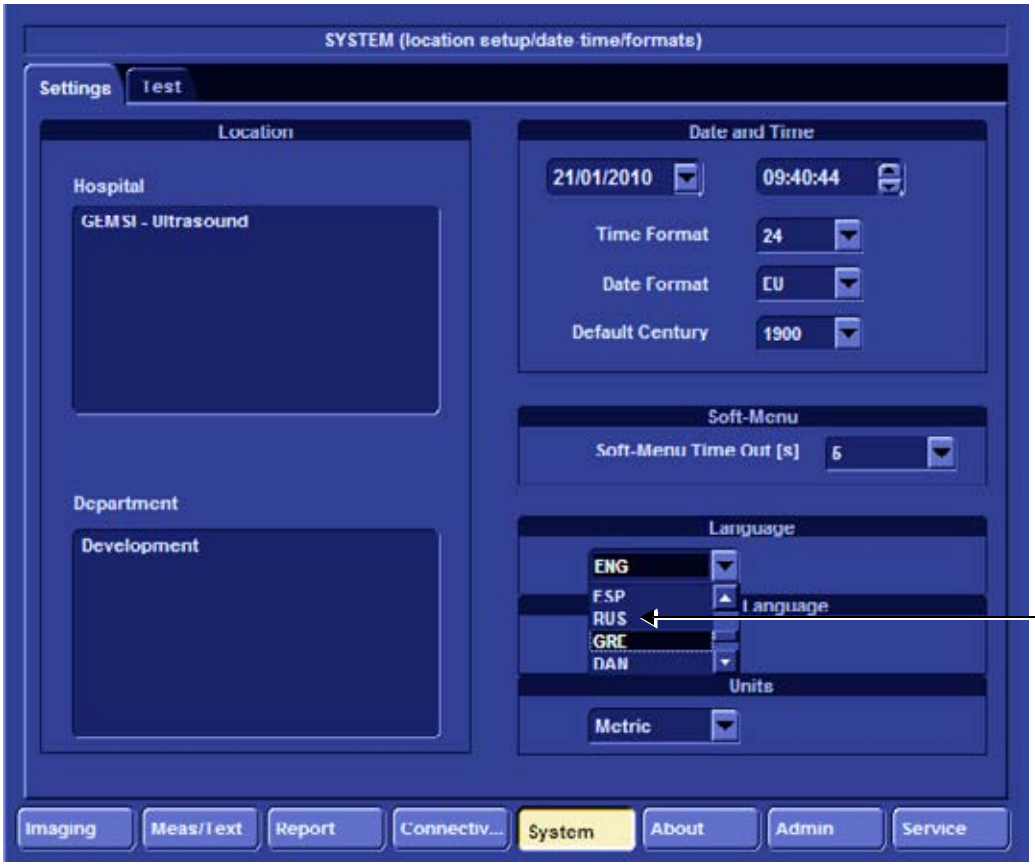


Figure 3-77 Language Selection

Table 3-7 Language Adjustments

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see Log On to the System as ADM on page 4 - 11. Select **SYSTEM**, if needed.	*The System Settings Window is displayed.*
2.	Use the Language drop down dialog, see Figure 3-77, to select your preferred language for the on-screen interface. The following languages are available; - ENG - English - NOR - Norwegian - DEU - German - ITA - Italian - FRA - French - ESP - Spanish - RUS - Russian (after selection, continue to step 3) - GRE - Greek (after selection, continue to step 3 - DAN - Danish - SWE - Swedish	The selected language will be used as soon as the unit has been restarted.

Table 3-7 Language Adjustments (cont'd)

STEP	TASK	EXPECTED RESULT(S)
3.	For Russian and Greek languages only: Reboot the system and, at the Windows level, navigate to the Control Panel. Select Regional Settings.	The Regional and Language Options dialog box opens:
4.	Under Standards and formats, in the language field, scroll down to the desired language (e.g. Russian) and click **OK**. Reboot the system. Note: For the Greek language, only the user interface is supported. It is not possible to input Greek from the keyboard.	The interface and keyboard input will be in Russian.

3-7-2-5 Units of Measure

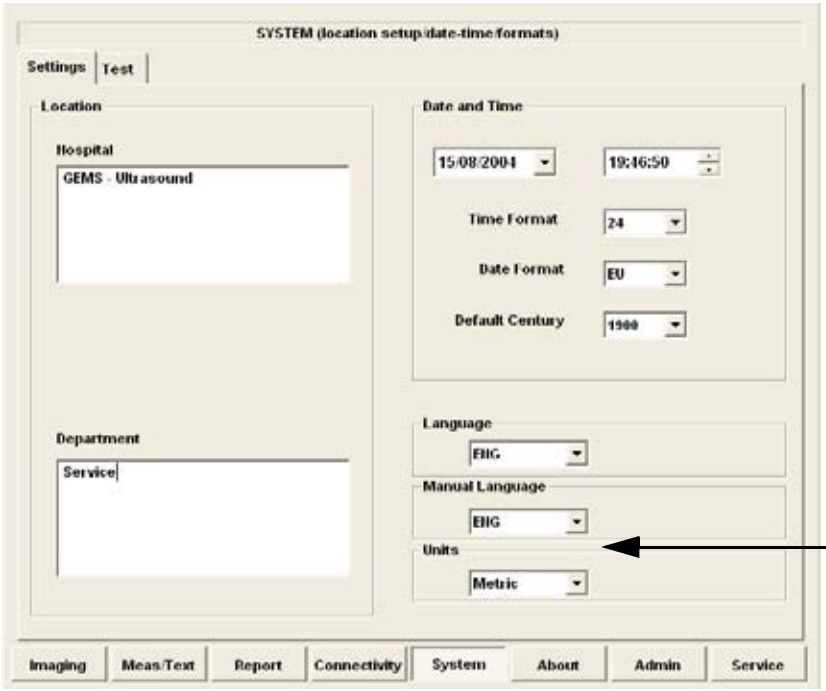


Figure 3-78 Select Units of Measure

Table 3-8 Select Units of Measure

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see Log On to the System as ADM on page 4 - 11. Select SYSTEM, if needed.	*The System Settings Window is displayed.*
2.	Use the drop down Units dialog (see Figure 3-78) to select Metric or US Units.	The selected units (Metric or US) will be used for measurements as soon as the unit has been restarted.
3.	Restart the scanner.	All the changed settings will be used after the restart.

3-7-3 Service Screen Set-up

3-7-3-1 Overview

The Service Screen gives you access to:

- Select Video Format to be used by the VCR
- Select the VCR type
- Adjust LCD Display Contrast and Backlight Intensity
- Keyboard Setups
- Printer Setup
- Disable TCPIP filtering

NOTE: The Disable TCPIP Filtering option should only be used for Troubleshooting procedures, after which it it is recommended to return immediately to the TCPIP Filtering enabled state.

3-7-3-2 Open Service Screen

1.) Press **CONFIG** (**F2**) and log on as Adm, see Log On to the System as ADM on page 4 - 11.
2.) Select SERVICE to view the Service Screen, see Figure 3-79 below.

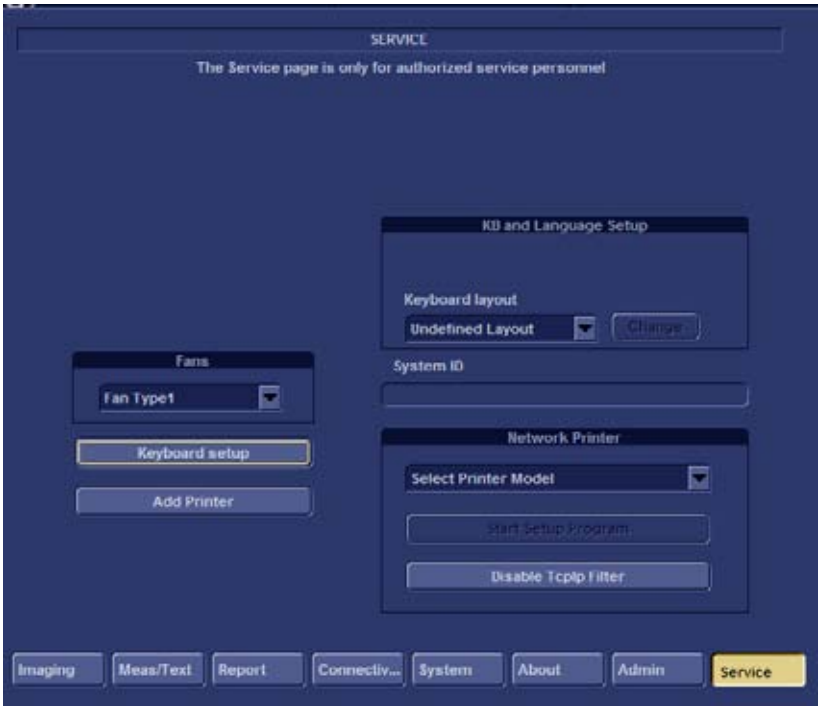


Figure 3-79 Service Screen (Example)

3-7-3-3 Adjust Keyboard Backlight Intensity

- Press <**CTRL**> + **L**.
- Use the sliders in the *Front Panel Lights Setup* dialog box to adjust **Backlight Intensity** of the Alphanumeric keyboard, Extended ultrasound keyboard, and/or Active keys, as required.

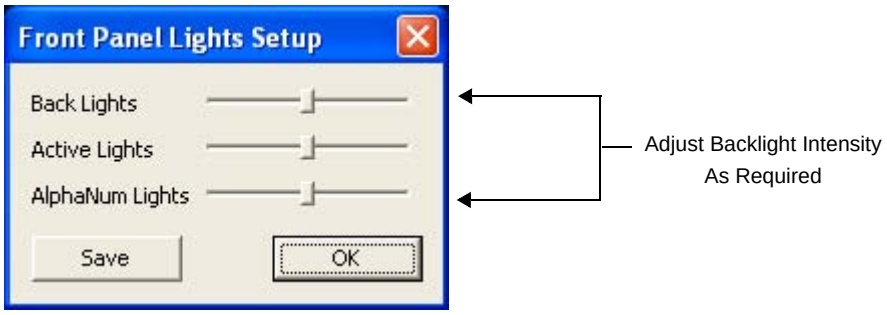


Figure 3-80 Keyboard Light Intensity Adjustment

3-7-3-4 LCD Display Adjustment and Calibration

Adjustments may be made to the LCD Display, to control and calibrate the *Contrast*, *Brightness*, and/or *Blue Tint* settings, as required.

For instructions, see LCD Display Adjustments and Calibration on page 6 - 1.

3-7-3-5 Keyboard Setup

1) Press <F2>, select Service Tab. The Select Keyboard Setup dialog is displayed.

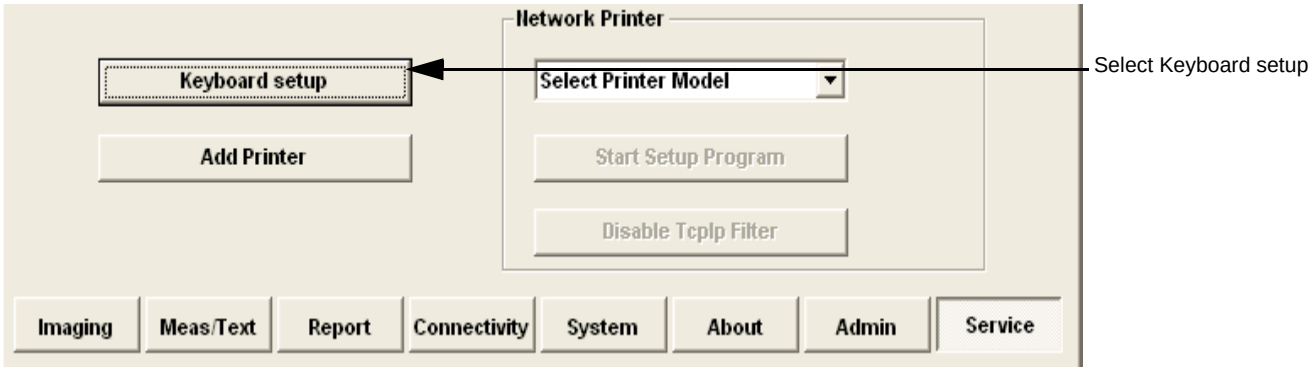


Figure 3-81 Select Keyboard Setup

2) Click **Keyboard Setup**.

The Regional and Language Options dialog box is displayed, which has controls for the following, described below:

- Regional Options - affects regional formatting of numbers, dates, times, etc.
- Languages - enables selection of the required language and methods used to enter text.
- Advanced - enables non-Unicode programs to display menus and dialogs in their native language.

3-7-3-5-1 Regional Options

- Select appropriate Format and Location, then click **Apply.**

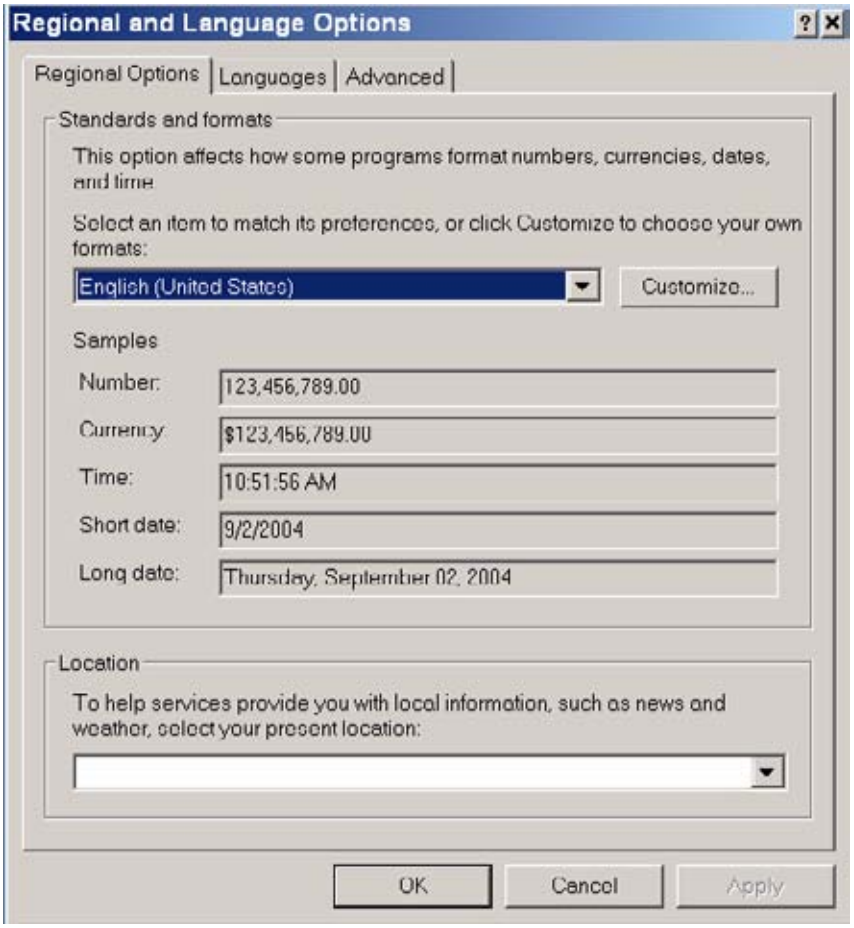


Figure 3-82 Regional Options

3-7-3-5-2 Languages

1.) Under the Languages tab, click **Details** to select appropriate Language.

2.) If necessary, activate applicable Supplemental Language Support check box, then click **Apply.**

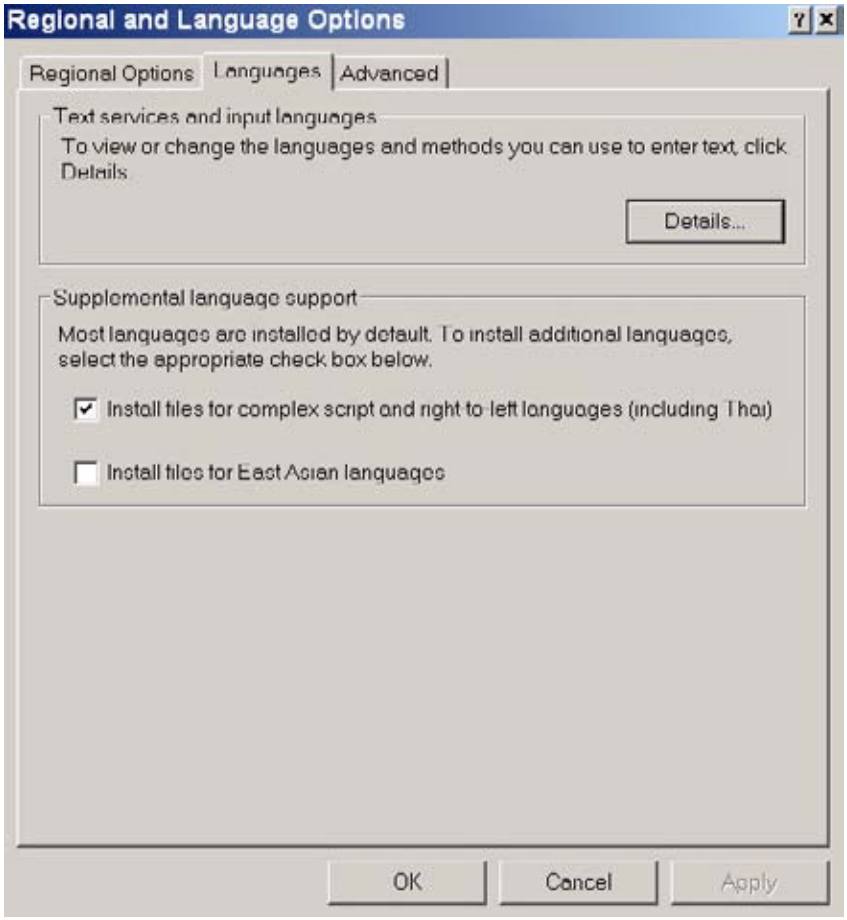

Regional and Language Options
Regional Options
Languages
Advanced
Text services and input languages
To view or change the languages and methods you can use to enter text, click Details
Details...
Supplemental language support
Most languages are installed by default. To install additional languages, select the appropriate check box below.
Install files for complex script and right-to-left languages (including Thai)
Install files for East Asian languages
OK
Cancel
Apply

Figure 3-83 Languages

3-7-3-5-3 Advanced

1.) Under the Advanced tab, select a language version of the non-unicode programs you want to use, then click **Apply**.

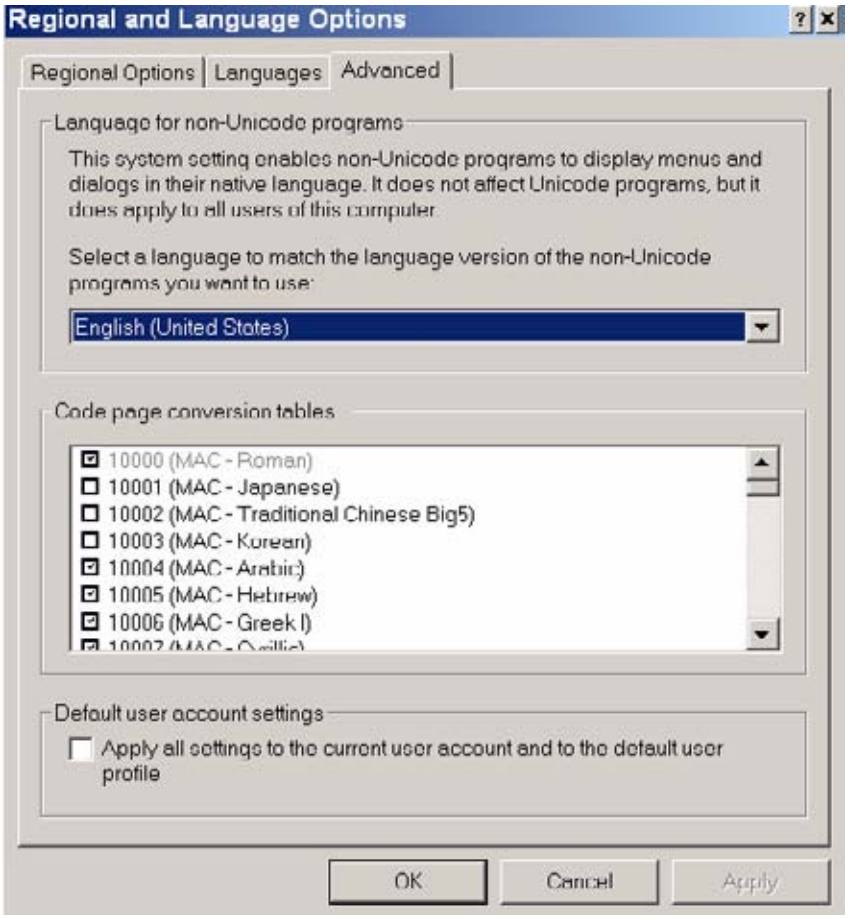

Regional and Language Options
Regional Options
Languages
Advanced
Language for non-Unicode programs
This system setting enables non-Unicode programs to display menus and dialogs in their native language. It does not affect Unicode programs, but it does apply to all users of this computer.
Select a language to match the language version of the non-Unicode programs you want to use:
English (United States)
Code page conversion tables
10000 (MAC - Roman)
10001 (MAC - Japanese)
10002 (MAC - Traditional Chinese Big5)
10003 (MAC - Korean)
10004 (MAC - Arabic)
10005 (MAC - Hebrew)
10006 (MAC - Greek I)
Default user account settings
Apply all settings to the current user account and to the default user profile
OK
Cancel
Apply

Figure 3-84 Advanced

3-7-3-6 Add Printer

NOTE: This option should not be used by un-authorized personnel. This option will prompt you to the Windows Installation Wizard. Normally, all software drivers are pre-installed and there is no need to use this functionality. In special cases where there is a need, follow the instructions provided by GE Medical Systems or the instructions in the respective printer installation manual.

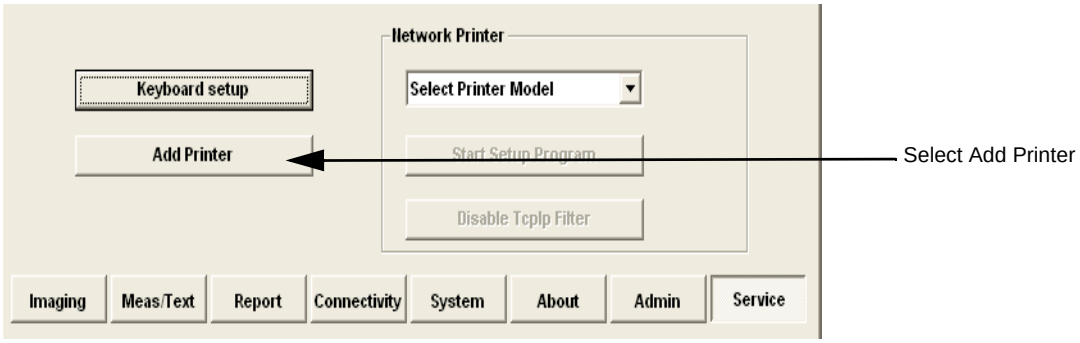


Figure 3-85 Select Add Printer

1.) Select ADD PRINTER to start the Add Printer (Installation) Wizard.

Add Printer Wizard
Welcome to the Add Printer Wizard
This wizard helps you install a printer or make printer connections.
If you have a Plug and Play printer that connects through a USB port (or any other hot pluggable port, such as IEEE 1394, infrared, and so on), you do not need to use this wizard. Click Cancel to close the wizard, and then plug the printer's cable into your computer or point the printer toward your computer's infrared port, and turn the printer on. Windows will automatically install the printer for you.
To continue, click Next.
< Back
Next >
Cancel

Figure 3-86 Add Printer Wizard

2.) Follow the instructions in the Wizard to install a new printer.

3.) When done, perform a full system shutdown, then boot-up the system into *Normal Scannng* mode.

Restarting the system allows the changes to take effect.
The newly-added printer is now listed and available for selection.

3-7-4 Configuring Peripherals

3-7-4-1 Approved Peripherals

The following lists the internal peripherals available for use with the Vivid-i™ and Vivid-q™ portable ultrasound scanner and details their method of connection:

- Printer - Black & White, digital, Sony (via USB).
- Printer - Color, digital, Sony (via USB).
- VCR - Mitsubishi, both PAL and NTSC versions are available (via VGA to S-Video converter).
- MO Drive (via USB).
- External USB Hard Disk (via USB).
  For detailed instructions on connection to the Vivid-i™ or Vivid-q™ system, refer to the External USB Hard Disk Installation Procedure on page 8 - 155.
- DVD\CD-R Drive (via USB).
- Printer - Deskjet, HP-450 (via USB).
- Virtual printer (any of the DeskJet printers can be used as virtual printers when the user is in a remote location).

NOTICE Vivid-i™/ Vivid-q™ supports reading of DVD media, but not writing data to DVD.

3-7-4-2 Network Peripherals (Optional)

The printers detailed below are connected via Ethernet (TCP/IP Network).

- **Lexmark Color LaserWriter Network Printer.**
  The printer is available in the following versions:
  - 100 V AC
    Lexmark C762 Color Printer
  - 110 V AC
    Lexmark C762 Color Printer
  - 220 V AC
    Lexmark C762 Color Printer

  Installation of the Lexmark C762 Color Printer is described in the *Lexmark C752N/C762N Color Printer Installation Manual*, Direction Number FC194475.

3-7-4-3 Virtual Printing (Optional)

Virtual printing is not configurable. The functionality of virtual printing provides the ability to print to a specific printer, even though it is not physically connected.

Once the printer has been re-connected again, all the spooled print jobs will be printed out automatically.

Sometimes this feature is device dependent. Therefore, in order to initiate the manual "print of all spooled jobs" process, proceed as described below.

1.) Press <**ALT**> + **P**.

The Printers and Faxes window is displayed.

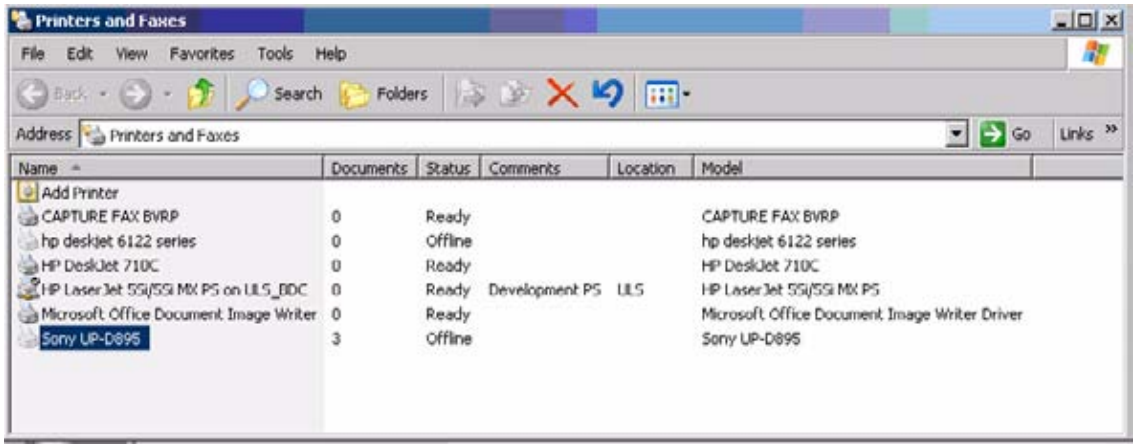

Printers and Faxes
File Edit View Favorites Tools Help
Search Folders
Address Printers and Faxes
Go Links
Name Documents Status Comments Location Model
Add Printer
CAPTURE FAX BVRP 0 Ready CAPTURE FAX BVRP
hp deskjet 6122 series 0 Offline hp deskjet 6122 series
HP DeskJet 710C 0 Ready HP DeskJet 710C
HP LaserJet 5Si/5Si MX PS on ULS_DDC 0 Ready Development PS ULS HP LaserJet 5Si/5Si MX PS
Microsoft Office Document Image Writer 0 Ready Microsoft Office Document Image Writer Driver
Sony UP-D895 3 Offline Sony UP-D895

Figure 3-87 Printers and Faxes Window

2) Right-click on the destination virtual printer (see Figure 3-87) and select **Open**.

The Virtual Printer Job Queue window is displayed.

Sony UP-D895 - Use Printer Offline
Printer Document View Help
Document Name Status Owner Pages Size
Test Page Rayero 1 1.26 MB
Test Page Rayero 1 1.26 MB
Test Page Rayero 1 1.26 MB
3 document(s) in queue

Figure 3-88 Virtual Printer Job Queue Window

3.) From the queued Print Jobs, right-click and select **Cancel** to clear any spooled jobs not required.

Figure 3-89 Resuming Spooled Print Job

4.) Right-click and select **Restart** to resume print job/s for printing, as required

3-7-4-4 Configuration of Peripherals on the SafeLock Cart

NOTICE **IMPORTANT** When using Peripherals on the Vivid-i™/ Vivid-q™ SafeLock Cart, always observe the general guidelines listed below.

General Guidelines

1) In *Standby* mode, no change should be made to USB-connected devices (regarding location, introduction of new USB device, removal of a currently-connected USB device).
2) USB devices should be connected and/or disconnected **only** in *Full Shutdown* or *Normal Scanning* mode.
3) USB devices should **not** be connected and/or disconnected before completion of tasks assigned to them.
4) Whenever the Vivid-i™/ Vivid-q™ ultrasound scanner is mounted on the SafeLock Cart, **always** use the ***lower*** USB port for the Hub.
5) Both the Vivid-i™/ Vivid-q™ ultrasound scanner and all connected devices working with scanner should be powered and connected to the SafeLock Cart (***only***)!

For the SafeLock Cart, there are two basic peripheral configurations that are recommended:

Configuration - Recommendation 1

- DVD always plugged into port 1 of the USB Hub
- MOD always plugged into any port (recommended *Port 2*)
- HP460 always plugged into any port (recommended *Port 3*)
- B&W or Color printer (recommended *Port 4*)

Configuration - Recommendation 2

- Memory Stick or HP460+Batt plugged directly into the *upper* USB port on the rear of the Vivid-i™/ Vivid-q™ ultrasound scanner.

3-7-5 Software Options Configuration

3-7-5-1 Software Option Installation

A Password (Software Option String) enables a software option or a combination of software options. This password is specific for each Vivid-i™/ Vivid-q™.

3-7-5-2 On-site Configuration

1.) Press **CONFIG** (**F2**) and log on as *Adm* - see Log On to the System as ADM on page 4 - 11.

2.) Select ADMIN (lower part of window),

3.) Select the SYSTEM ADMIN tab.

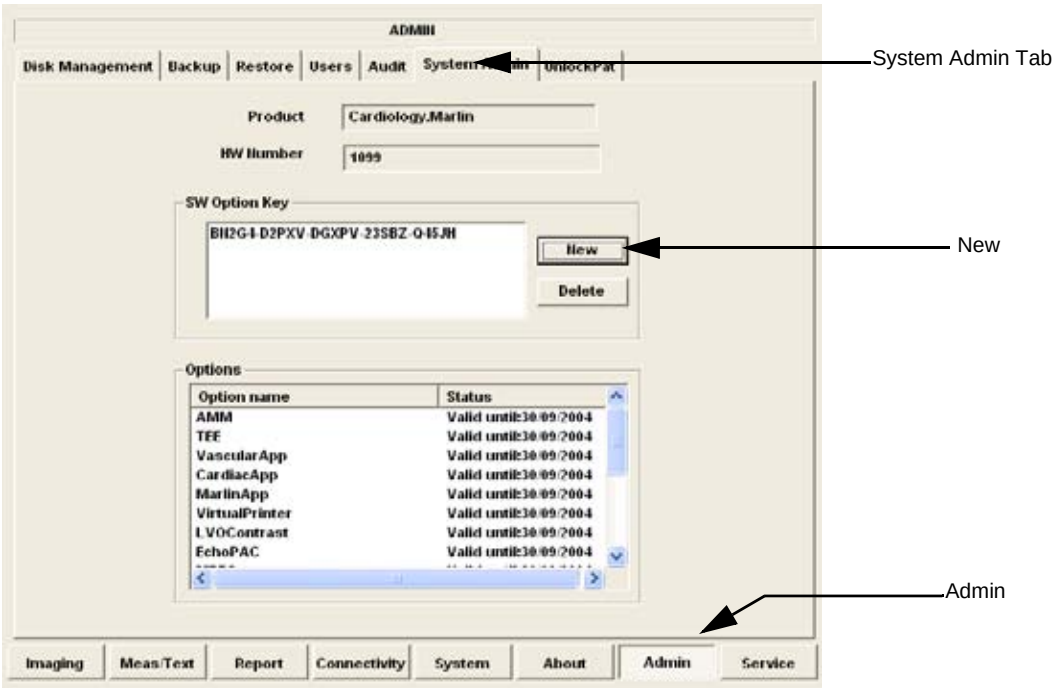


Figure 3-90 System Admin screen

4.) Select NEW to open the New Key dialog where you type the Software Option Key (Serial String).

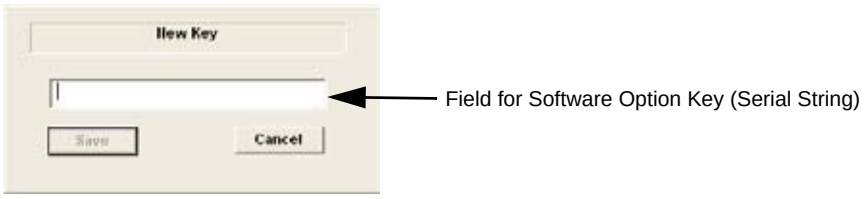


Figure 3-91 Type Software Option Key

CAUTION **Incorrect password entry will result in loss of system options.**
If password is incorrect, please contact your local GE Service representative.

5.) Type the Password (Software Option Key).

6.) Press OK to save the new setting.

7.) Close the Config window.

3-7-5-3 Remote Check and Configuration

Contact the OnLine Center for InSite Checkout.

Section 3-8
Connectivity Setup

3-8-1 Connectivity Introduction

The Vivid-i™/ Vivid-q™ ultrasound unit can be connected to various connectivity devices, such as DICOM devices and EchoPac servers. The following sections describe how to connect the system to a remote archive/work station or a DICOM service, using a TCP/IP connection.

This section describes communication and connection options between the Vivid-i™/ Vivid-q™ ultrasound unit and other devices in the hospital information system.

The following scenarios are covered:

- A stand-alone Vivid-i™/ Vivid-q™ scanner.
- A Vivid-i™/ Vivid-q™ and one or several EchoPAC PC workstations in a “Sneaker Net” environment. (“Sneaker Net” means that you use an MO Disk to move data because no network is available).
- A Vivid-i™/ Vivid-q™ and an EchoPAC PC workstation in a direct connect environment.
- A Vivid-i™/ Vivid-q™ and a DICOM server in a network.
- A Vivid-i™/ Vivid-q™ scanner configured for MPEGVue export to removable media: CD, DVD, or USB Memory stick. (Data can later be viewed on any remote PC).
- A Vivid-i™/ Vivid-q™ workstation connected to the Hospital Information System (HIS), via the Vivid HL7 Gateway.
- A Vivid-i™/ Vivid-q™ scanner configured for eVue.
  Images or loops may be transmitted to a designated PC (“e-Vue PC”) on the network (in compact MPEG format), and will appear at the review PC in almost real time.

3-8-1-1 The Dataflow Concept

Communication between the Vivid-i™/ Vivid-q™ ultrasound unit and other information providers on the network takes the form of dataflows. Each dataflow defines the transfer of patient information from either an input source to the unit, or from the unit to an output source (see examples in Figure 3-92 on page 3-93).

Patient information can include demographic data and images, as well as reports and Measurement and Analysis (M&A) data.

A dataflow is a set of pre-configured services. Selecting a dataflow will automatically customize the ultrasound unit to work according to the services associated with this dataflow.

By utilizing dataflows, the user can configure the Vivid-i™/ Vivid-q™ ultrasound unit to optimally meet the needs of the facility, while keeping the user interface unchanged. Once the dataflow is selected, the actual location of the database is entirely transparent.

3-8-1-2 Dataflow Naming Convention

The predefined dataflows have descriptive names.

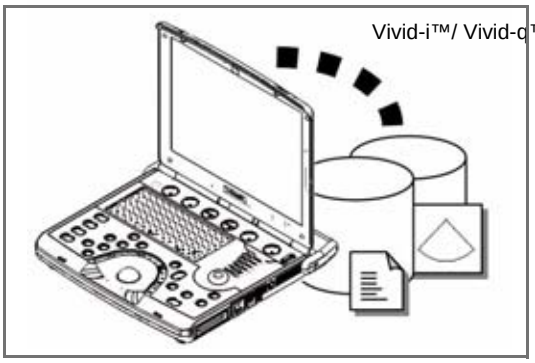
Example: *LocalArchive-MOD dataflow*

The name indicates that patient data is archived locally in the archive on the internal hard disk and images are stored to an MO disk.

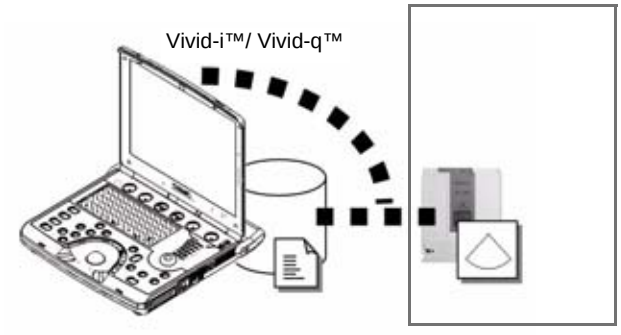
A list of all the predefined dataflows is included in the Vivid-i™/Vivid-q™ User Manual.

3-8-1-3 Dataflow Examples

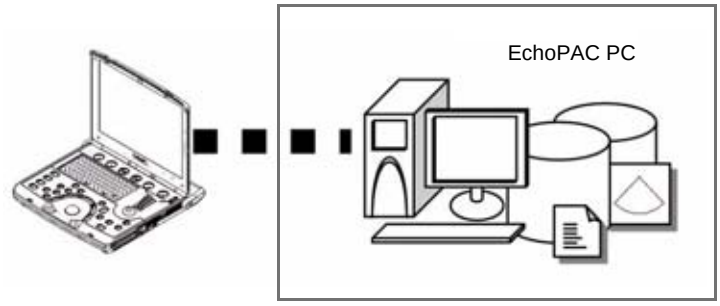
LocalArchive-Int.HD dataflow:
The local database is used for patient archiving.
Images are stored to internal hard drive.



LocalArchive-MOD dataflow:
The local database is used for patient archiving.
Images are stored to a MOD



RemoteArch-RemoteHD dataflow:
A remote database is used for patient archiving.
Images are also stored to a remote archive.



Worklist/Local Archive-DICOMServer/Int.HD dataflow:
Search in the DICOM Modality Worklist, the patient found is copied into local database.

The patient information and the examination results are stored to the local database.

Images are stored to a DICOM server and to an image network volume on the local hard drive.

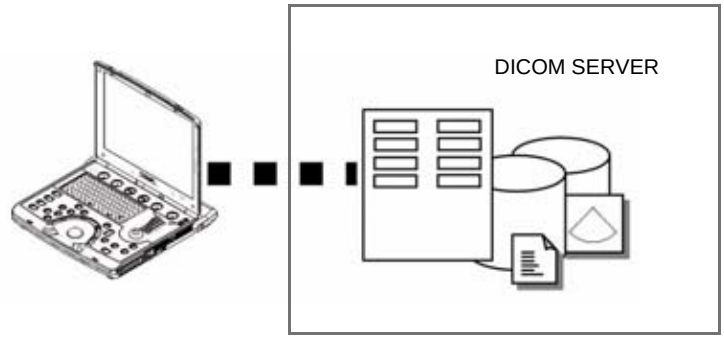


Figure 3-92 Examples of Dataflows

3-8-1-4 Stand-alone Vivid-i™/ Vivid-q™

In this scenario, images will most likely be reviewed from a VCR tape. If digital images are stored, they should be saved directly on a MOD.

3-8-1-5 "Sneaker Net" Environment

In this scenario, the EchoPAC PC (one or several) is used for review of studies acquired on one or more Vivid-i™/ Vivid-q™ scanners without being connected in a network. Images can be stored on the scanner's internal hard drive (recommended) or on a dedicated MOD.

- **Images Stored on Internal Hard Drive**

  In this configuration, images are first stored on the Vivid-i™/ Vivid-q™ scanner's hard drive and then exported from the scanner's hard drive to a sneaker MOD, and finally imported from the sneaker MOD to the EchoPAC PC's internal hard drive.

- **Images Stored on Dedicated MO Disk**

  In this configuration, the images are stored directly on a dedicated MOD and imported to the EchoPAC PC's internal hard drive.

3-8-1-6 Direct Connection from Vivid-i™/ Vivid-q™ to an EchoPAC PC Workstation

In this configuration, the data is transferred from the Vivid-i™/ Vivid-q™ to a dedicated EchoPAC PC Workstation over an Ethernet connection.

The connection may be done in one of three ways:

- with a crossover cable as a Peer-to-Peer Network
- connection via a Local Area Network (LAN) - set up for this special use only.
- connection via the hospital network (Local Area Network - LAN or Wide Area Network - WAN)

The database from the EchoPAC PC is used as the master and images are stored directly to the EchoPAC PC internal hard drive.

In this configuration, the scanner is just an intermediate acquisition unit which, after completion of a study, will not contain any patient information, measurements, or images. The acquisition can be done online or offline.

3-8-1-7 Vivid-i™/ Vivid-q™ and a DICOM Server in a Network

In this configuration, the Vivid-i™/ Vivid-q™ is configured to work with a DICOM server in a network environment. Usually, this will be the hospital network. Images are first saved on the local image buffer on the scanner. At the end of the examination, the images are sent to the DICOM server via a DICOM spooler. This scenario requires that the scanner is configured to be connected to the DICOM server.

3-8-2 Physical Connection

3-8-2-1 Ethernet Switch Connections

An Ethernet Switch (P/N: 066E0741), is used to connect the Vivid-i™/ Vivid-q™ system to an EchoPAC PC and a network printer.

Informative LEDS
Ethernet Cable connectors
MDI Button Controls the fifth connector, making it crossed or non-crossed.
FS705

Figure 3-1

Figure 3-93 Ethernet Switch Identifications

Position	Label	Function
	X To PC	To connect an end station or a Server to the Port
	= To HUB	To connect a HUB or another Switch to the Port

Table 3-9 MDI Button Position Descriptions

3-8-2-2 Local Network Connection to EchoPAC PC Workstation

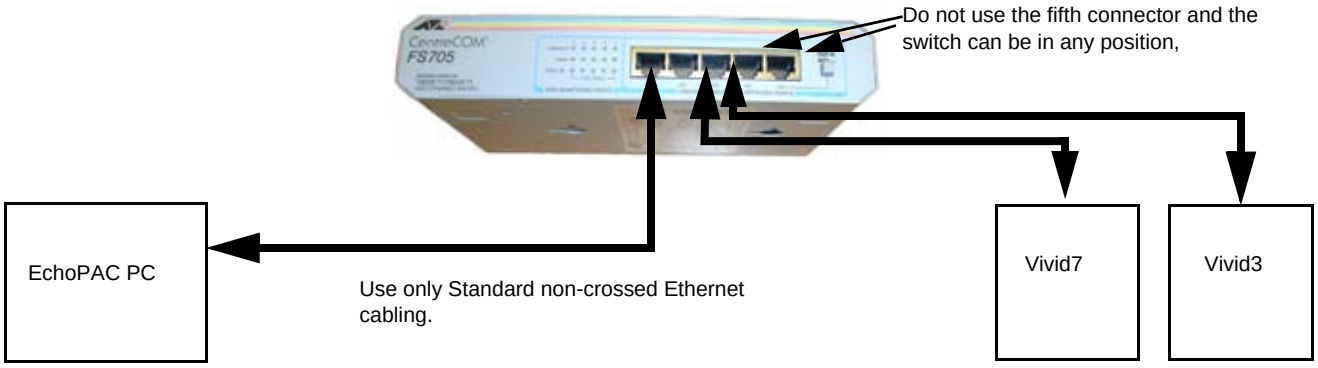

Do not use the fifth connector and the switch can be in any position,
EchoPAC PC
Use only Standard non-crossed Ethernet cabling.
Vivid7
Vivid3

Figure 3-94 Local Network Connection

3-8-2-3 Hospital Network Connection to EchoPAC PC Workstation

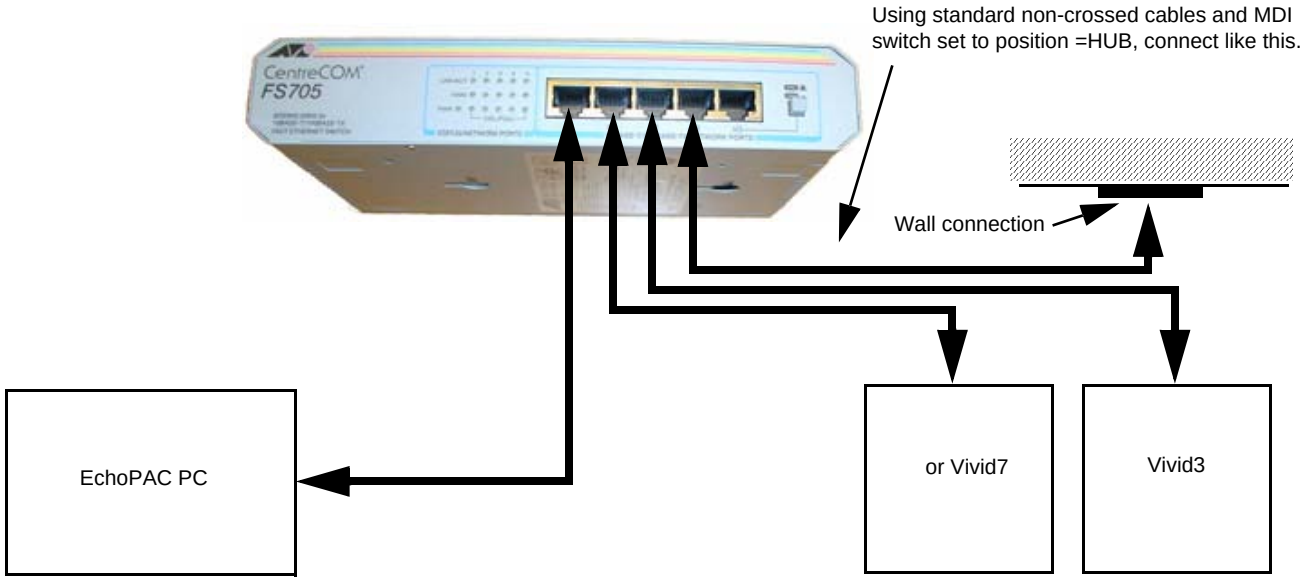

Using standard non-crossed cables and MDI switch set to position =HUB, connect like this.
Wall connection
EchoPAC PC
or Vivid7
Vivid3

Figure 3-95 Hospital Network Connections

See the EchoPAC PC Service Manual (Part Number EP091298) for details about the EchoPAC PC, and the required set-up procedures.

3-8-2-4 Wireless USB Network Configuration

3-8-2-4-1 Installing the Compact Wireless-G Adaptor Software

1.) Connect the DVD-CD RW drive to the Vivid-i™/ Vivid-q™ system as described in *Section 3-5-1-3* on page 3-28.

2.) Insert the Wireless USB driver P/N 5391287 identified with the GE label in the DVD drive.

3.) Boot up the system in maintenance mode and navigate to Windows Explorer.

4.) Create a new folder on the system's **D** drive and name it **WIFI DRIVER**.

5.) Copy the contents of the disk to the WIFI DRIVER folder.

6.) Disconnect the DVD drive from the system.

7.) Plug the wireless USB device connected to the R-adaptor into the USB port at the rear of the Vivid-i™/ Vivid-q™system. Refer to Figure 3-18 on page 3-28.

The New Hardware installation wizard opens, as shown in Figure 3-96.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission)
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Figure 3-96 New Hardware Installation Wizard

8.) Select "**No, not this time"** (Figure 3-96), and click **Next**.

9.) Select "**Install from a list or specific location (Advanced)**" - see Figure 3-97 and click **Next**.

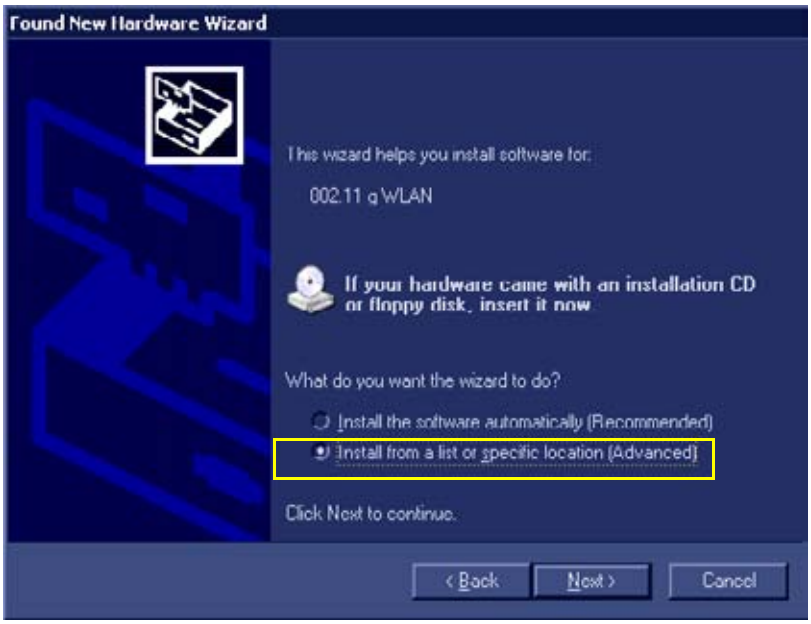

Found New Hardware Wizard
This wizard helps you install software for:
002.11 g WLAN
If your hardware came with an installation CD or floppy disk, insert it now
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 3-97 Install from a List or Specific Location

10.) Select **Include this location in search** (Figure 3-98) and browse to "**D:\WIFI DRIVER**" (Figure 3-99).

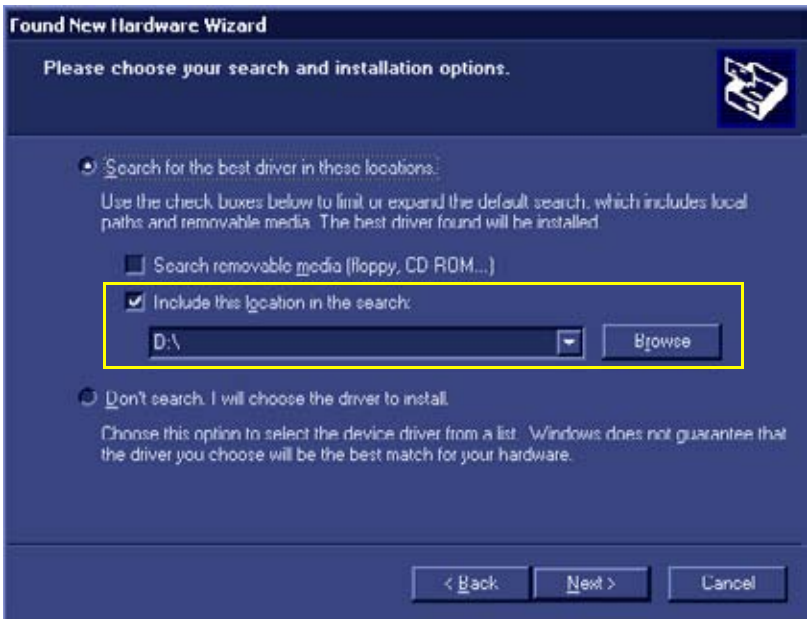

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD ROM...)
Include this location in the search:
D:\
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

Figure 3-98 Include this Location in Search

11.) Click **Next**.

The following screen opens (Figure 3-99).

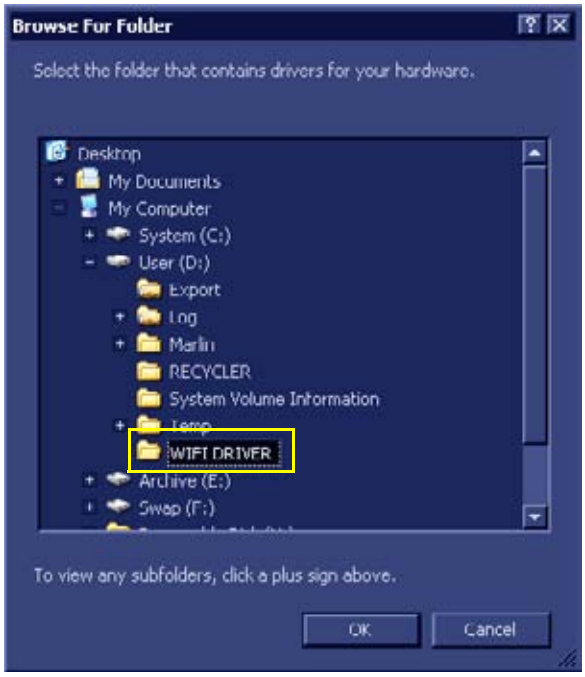


Figure 3-99 WIFI DRIVER Folder

12.) Select the **WIFI DRIVER** folder, then click **OK.**

The following screen opens:

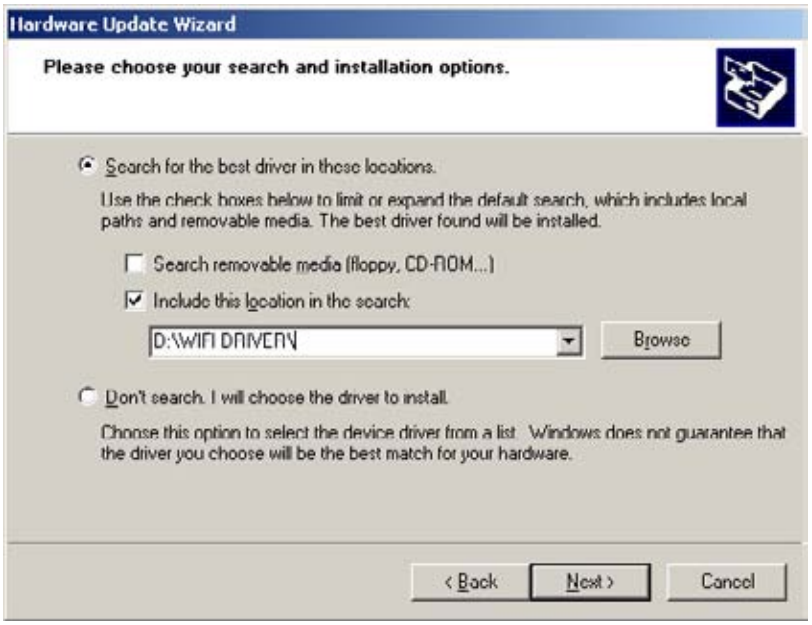

Hardware Update Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\WIFI DRIVER\
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

Figure 3-100 Hardware Update Wizard

13.) Click **Next**.

The installation process continues displaying wizard screens until installation is complete.

14.) Click **Finish**

The installation process is complete.

3-8-2-4-2 Configuring the Wireless Adaptor

1.) From the default Vivid-i™/ Vivid-q™ scanner screen, press **Config**. Select the **Connectivity** tab and from the Connectivity screen, click **TCP/IP**.

2.) Click **Advanced Settings** to open the Network Connections screen - see Figure 3-101.

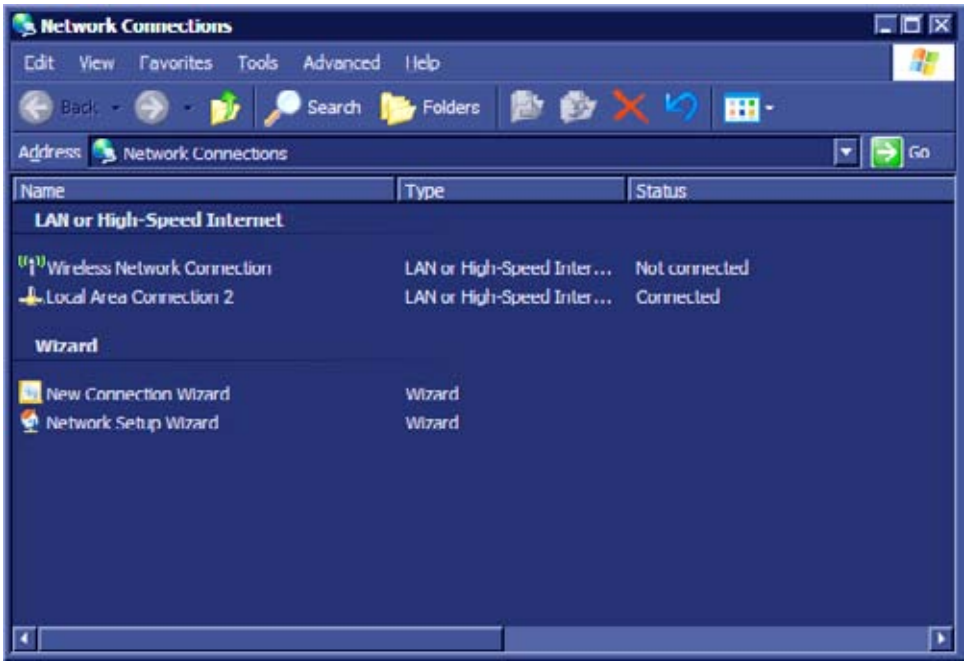


Figure 3-101 Network Connections

3.) From the Wireless Network Connection screen navigate to **Wireless Network Connection 8** and double-click to open the *Wireless Network Connection 8* screen - see Figure 3-102.

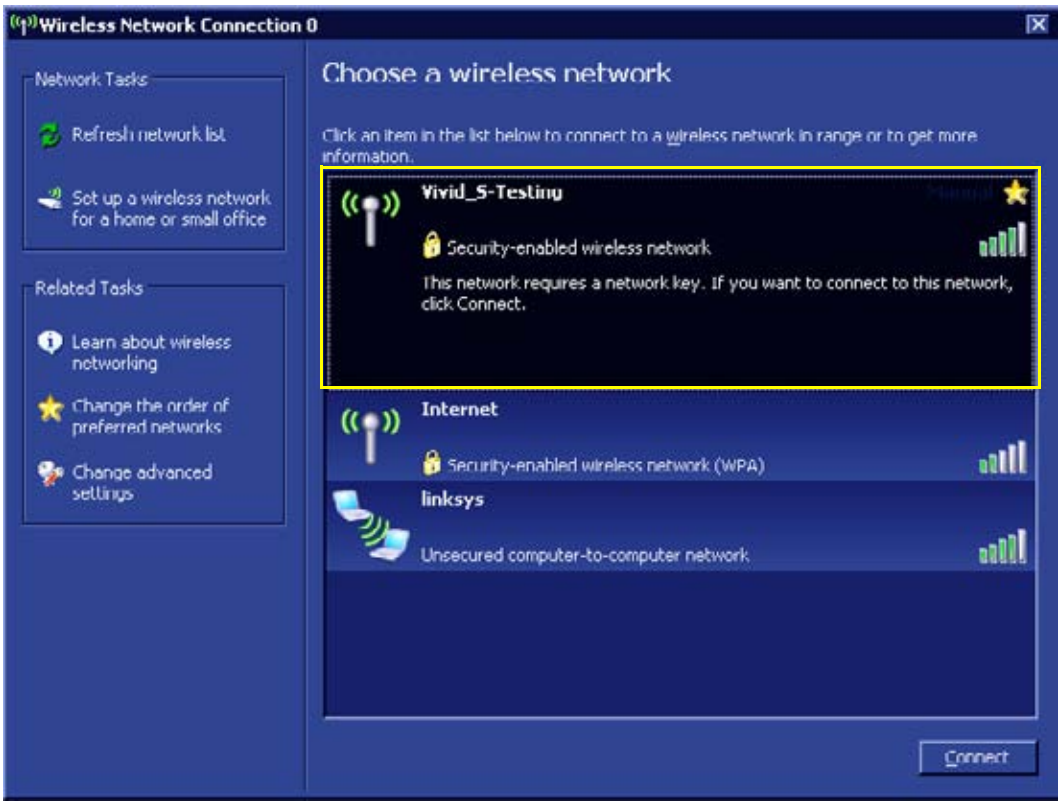

Wireless Network Connection 0
Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Choose a wireless network
Click an item in the list below to connect to a wireless network in range or to get more information.
Vivid_S-Testing
Security-enabled wireless network
This network requires a network key. If you want to connect to this network, click Connect.
Internet
Security-enabled wireless network (WPA)
linksys
Unsecured computer-to-computer network
Connect

Figure 3-102 Wireless Network Connection 8

4.) Select the appropriate wireless network and click **Connect.**
(In this example - Figure 3-102 - the wireless network connection is **Vivid_S-Testing**.)

The Wireless Network Connection dialog box opens - see Figure 3-103.

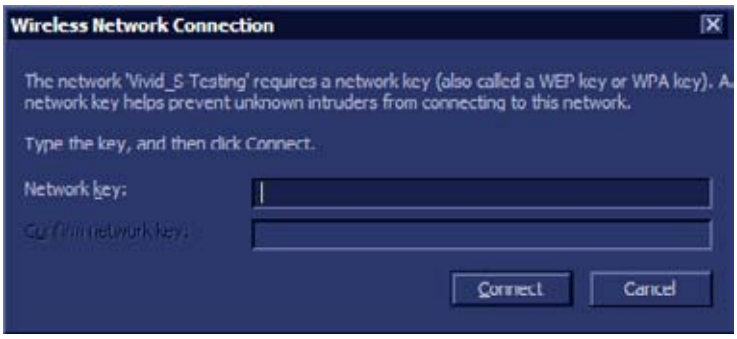

Wireless Network Connection
The network 'Vivid_S Testing' requires a network key (also called a WEP key or WPA key). A network key helps prevent unknown intruders from connecting to this network.
Type the key, and then click Connect.
Network key:
Confirm network key:
Connect
Cancel

Figure 3-103 Wireless Network Connection Dialog Box

5.) Type the required network key in the **Network key** field, then click **Connect**.

The Wireless detection process screen is displayed - Figure 3-104.

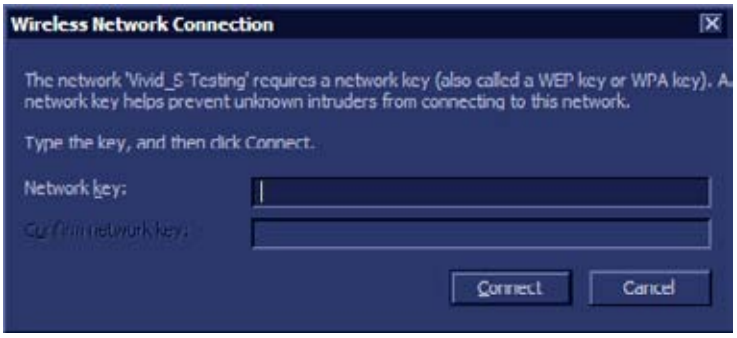

Wireless Network Connection
The network 'Vivid_S Testing' requires a network key (also called a WEP key or WPA key). A network key helps prevent unknown intruders from connecting to this network.
Type the key, and then click Connect.
Network key:
Confirm network key:
Connect
Cancel

Figure 3-104 Wireless Detection Process

At the end of the wireless detection process, a message displays on the screen indicating that the wireless adaptor is connected - see Figure 3-105.

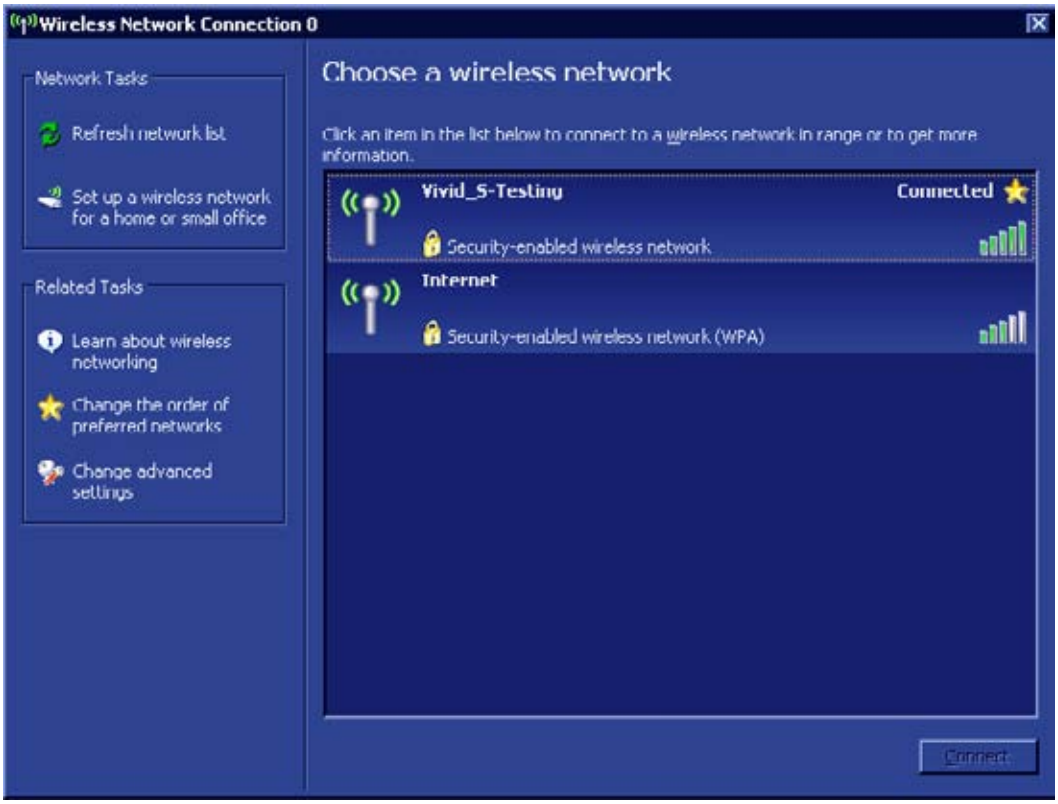

Wireless Network Connection 0
Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Choose a wireless network
Click an item in the list below to connect to a wireless network in range or to get more information.
Vivid_S-Testing
Connected
Security-enabled wireless network
Internet
Security-enabled wireless network (WPA)
Connect

Figure 3-105 Confirmation that Wireless Adaptor is Connected

6.) Return to the instructions for Installing the Compact Wireless-G Adaptor Software on page 3 - 97 and repeat the entire procedure in order to configure the second USB port.

7.) When done, proceed to perform the following functionality tests:

- Wireless USB Network Test on page 4 - 31

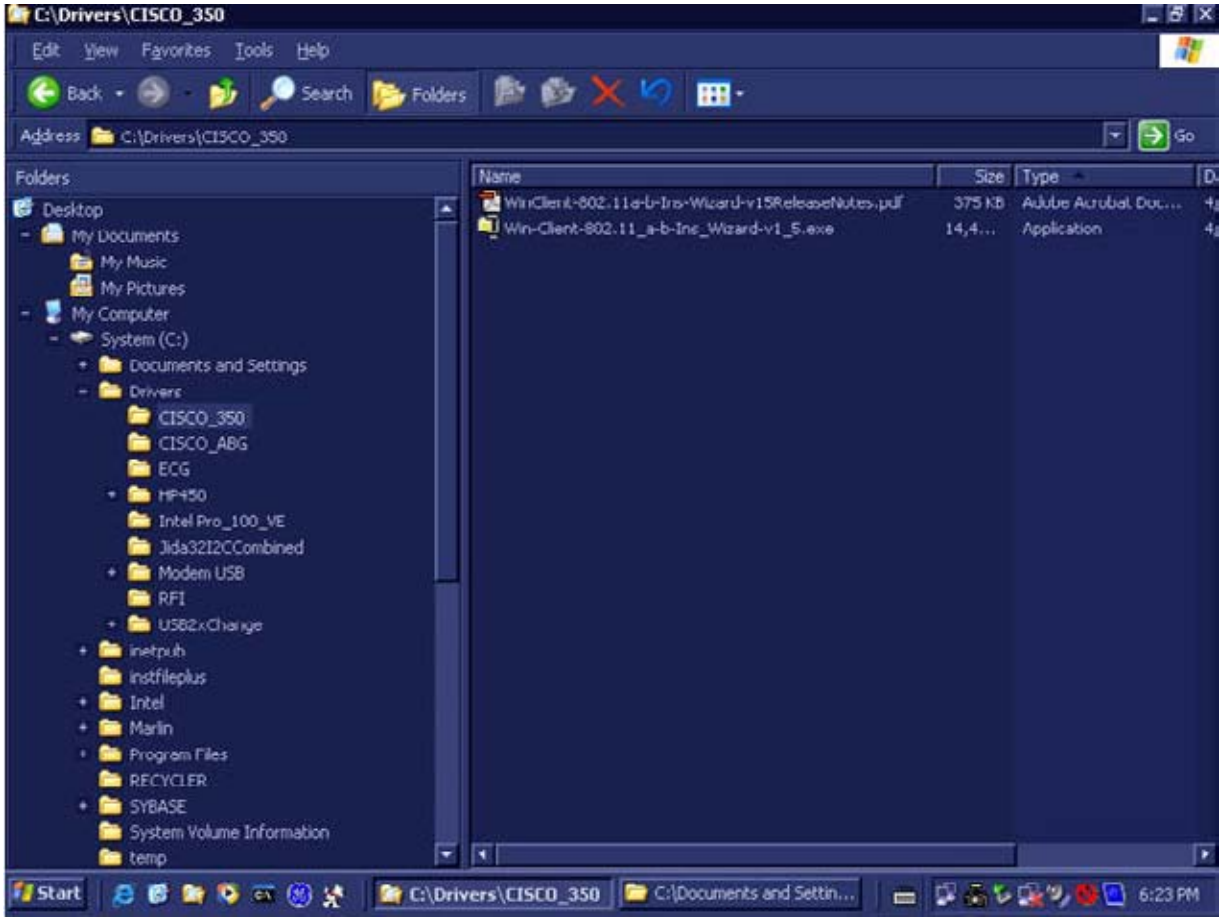


Figure 3-106 CISCO_350 Sub-directory

8) .

3-8-2-5 Stand-alone Vivid-i™/ Vivid-q™

No network connection needed.

3-8-2-6 "Sneaker Net" Environment

No network connection needed.

3-8-2-7 Connection from Vivid-i™/ Vivid-q™ to an EchoPAC PC Workstation

Direct Cable Connection from Vivid-i™/ Vivid-q™ to an EchoPAC PC Workstation via a Crossover Cable

You will only need a Crossover Cable for network use to connect the two units this way.

1.) Connect one end of the Crossover Cable to the network connector on the Vivid-i™/ Vivid-q™.

2.) Connect the other end to the network connector to the EchoPAC PC Workstation, see Chapter 3 in the EchoPAC PC Workstation Service Manual.

Connection via a Peer-to-Peer Network

You will need a network hub and one network cable for each unit connected to the hub.

See Ethernet Switch Connections on page 3 - 95.

Connection via Hospital Network

You will need one network cable to connect the Vivid-i™/ Vivid-q™ to a wall outlet on the hospital's network.

3-8-2-8 Connection between a Vivid-i™/ Vivid-q™ and a DICOM Server on a Network

You will need one network cable.

1.) Connect one end of the cable to the Ethernet connector on the Vivid-i™/ Vivid-q™.

2.) Connect the other end of the cable to the wall outlet.

If a Peer-to-Peer Network is connected to the hospital's network, you may connect the Vivid-i™/ Vivid-q™ to the Peer-to-Peer Network.

3-8-3 Connectivity Configuration

NOTE: If connected to a stand-alone network (Peer-to-Peer network with a Vivid-i™/ Vivid-q™ scanner, an EchoPAC PC work station and eventually a network printer), you should use default delivery settings.

3-8-3-1 Introduction

To be able to use the network functions when connected to a hospital network, the scanner must have a proper network address.

- Before you can set up the scanner, you need to collect some information. Refer to the "Worksheet for DICOM Network Information in Figure 2-2 on page 2-10. Typically, the source for this information is the network administrator.
- Follow the steps below to prepare the scanner for use on the network.

3-8-3-2 Select TCP/IP Set-up Screen

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in Log On to the System as ADM on page 4 - 11.

2.) If not already selected, select CONNECTIVITY from the bottom of the screen.

3.) Select the TCP/IP TAB (it is named Tcpip).

.

Computer Name:
For GE Healthcare - Global Ultrasound, this name is on the form:
Vivid_I-00nnnn, where “00nnnn” is a number (nnnn is the scanner’s serial number).

IP Settings:
IP Settings area for the Vivid-i™/ Vivid-q™ scanner.

Remote Archive Setup area:
IP settings area for a Remote Archive. Example: EchoServer.
Default Setup:
Remote Archive IP-Addr: 10.0.0.4
Remote Archive Name: EchoPAC7-000001

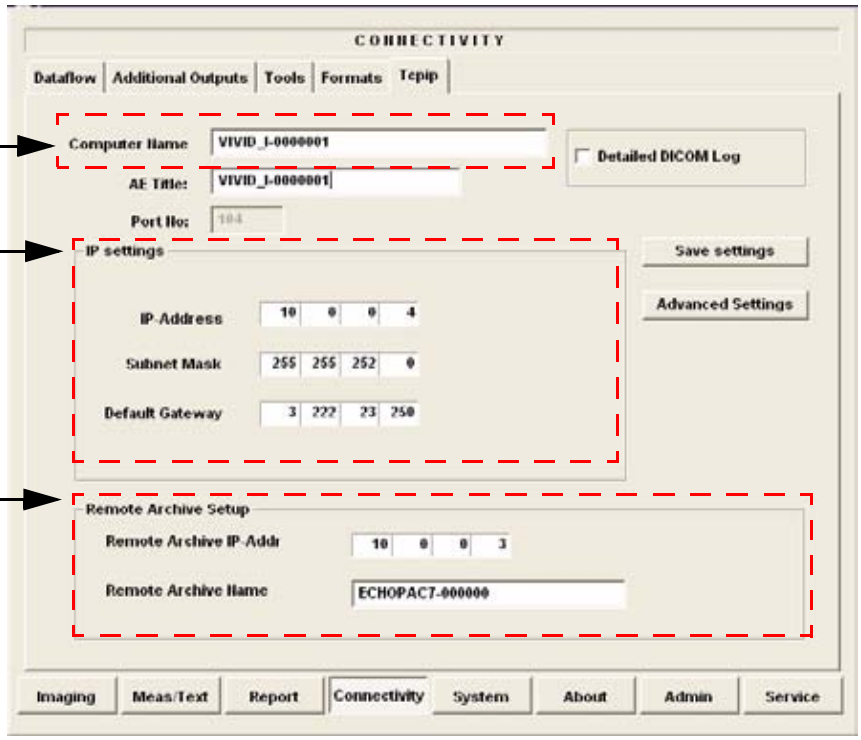


Figure 3-107 TCP/IP Set-up Screen for Vivid-i™/ Vivid-q™, Overview (Example)

3-8-3-3 Set the Scanner's Network Information

In the IP settings area of the screen, enter the following:

1.) IP Address for scanner. (Default IP Address from factory: 10.0.0.3).
2.) Subnet Mask for scanner. (Default Subnet Masks from factory: 255.255.255).
3.) IP address for Default Gateway. (Default Gateways from factory IP address: 0.0.0.0).
4.) In addition, the scanner's AE Title must be entered in the DICOM server's setup.

.

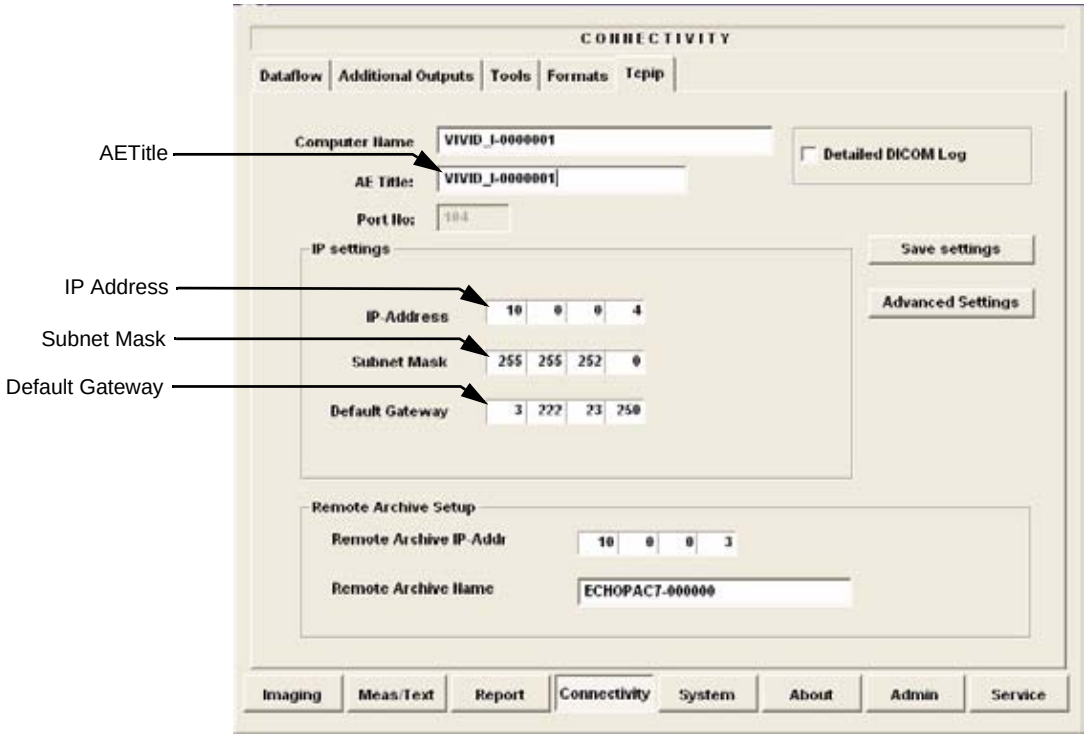


Figure 3-108 TCP/IP Set-up for Vivid-i™/ Vivid-q™

3-8-3-4 Set the Remote Archive's Network Information

In the Remote Archive Setup area of the screen (see example in Figure 3-109), enter the following:

1.) Remote Archive IP address. (Default IP Address from factory: 10.0.0.4).
2.) Remote Archive Name. (Default Remote Archive Name from factory: ECHOPAC7-000001).

.

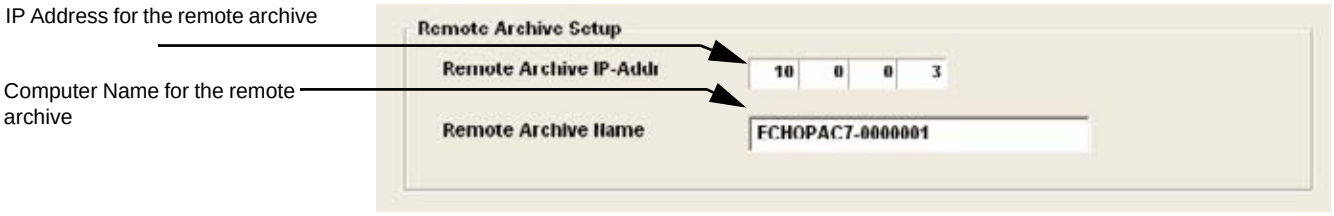


Figure 3-109 TCP/IP Set-up for Vivid-i™/ Vivid-q™

3-8-3-5 Vivid-i™/ Vivid-q™ Remote Path Configuration

The Vivid-i™/ Vivid-q™ Remote Path feature enables the user to define an additional user name, other than the default "E1c2h3o4C5l6i7e8n9t".

3-8-3-6 Configuring the Vivid-i™/ Vivid-q™ Remote Path

NOTE: Before starting this procedure, verify that the destination PC / Network has a Shared folder (remote path) with user permissions. Refer to section 3-8-9-1-1 on page 3-145 for creating a new user in the remote PC or network.

NOTE: The paths below (refer to Figure 3-110) are used as follows:

- **Save As PDF Network Path** - used for saving system Reports as PDFs.
- **Remote Path** - used for Save As, Export from Q-Analysis, and for exporting error logs with "Alt + D".

1.) From the system keyboard press **Config** and log on as an ADM user with the appropriate password.

2.) Click **Connectivity** (from the bottom row of buttons) on the screen and select the **Tools** tab.

The Tools screen opens - see Figure 3-110.

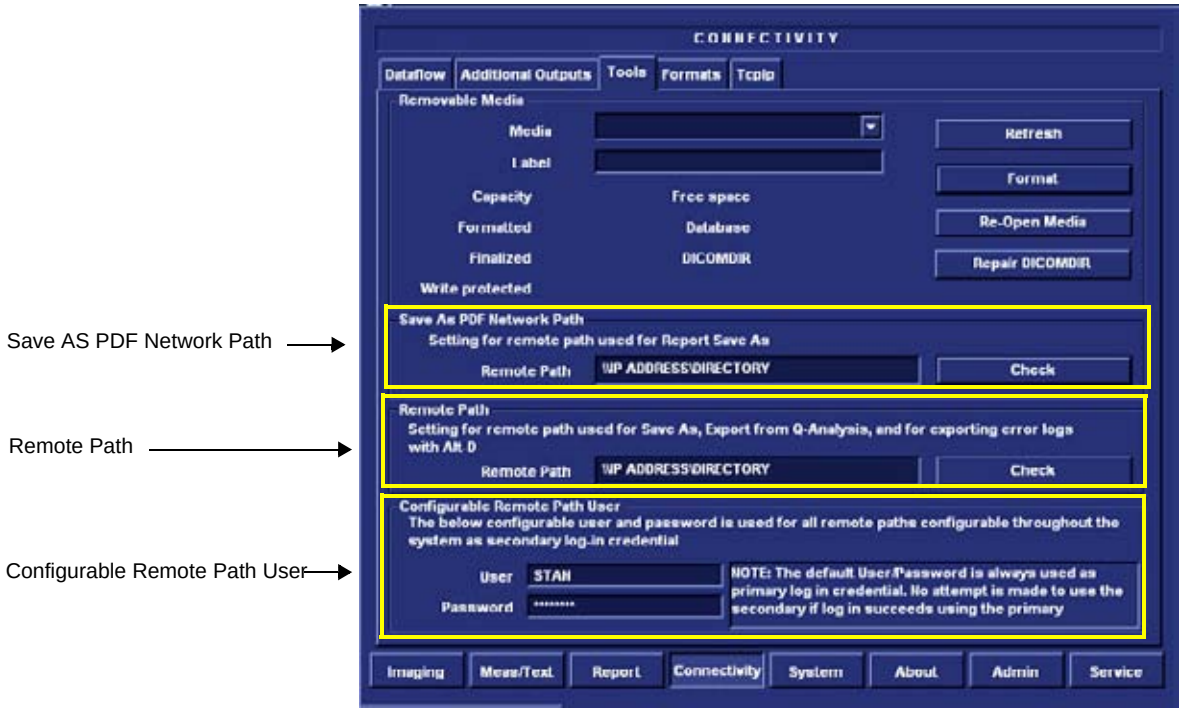


Figure 3-110 Tools Screen

3.) Under "Save As PDF Network Path", in the Remote Path field, type the remote path.

For example, in Figure 3-110 type: **\\IP ADDRESS\DIRECTORY**, where directory is the name of the shared folder in the destination PC.

4.) Click **Check** to verify the connection.

NOTE: When clicking the Check button, you might momentarily see a "failed" message that disappears if you click Check a second time. The system will then confirm the setting.

5.) Under "Setting for Remote Path used for Save As...", type the remote path as follows: **\\IP ADDRESS\DIRECTORY**.

6.) Click **Check** to verify the connection.

3-8-3-6-1 Configuring the Repository Remote Path

NOTE: It is possible to configure an additional user name and password for all remote paths. These settings are only used if the system fails to log on the default user and password.

- Under Configurable Remote Path User (refer to Figure 3-110), type the desired user name and password, as configured on the destination PC.
  (This is the password usually assigned by the local IT person).

3-8-3-7 Save the New Settings

1.) Press SAVE SETTINGS to save the new settings.

.

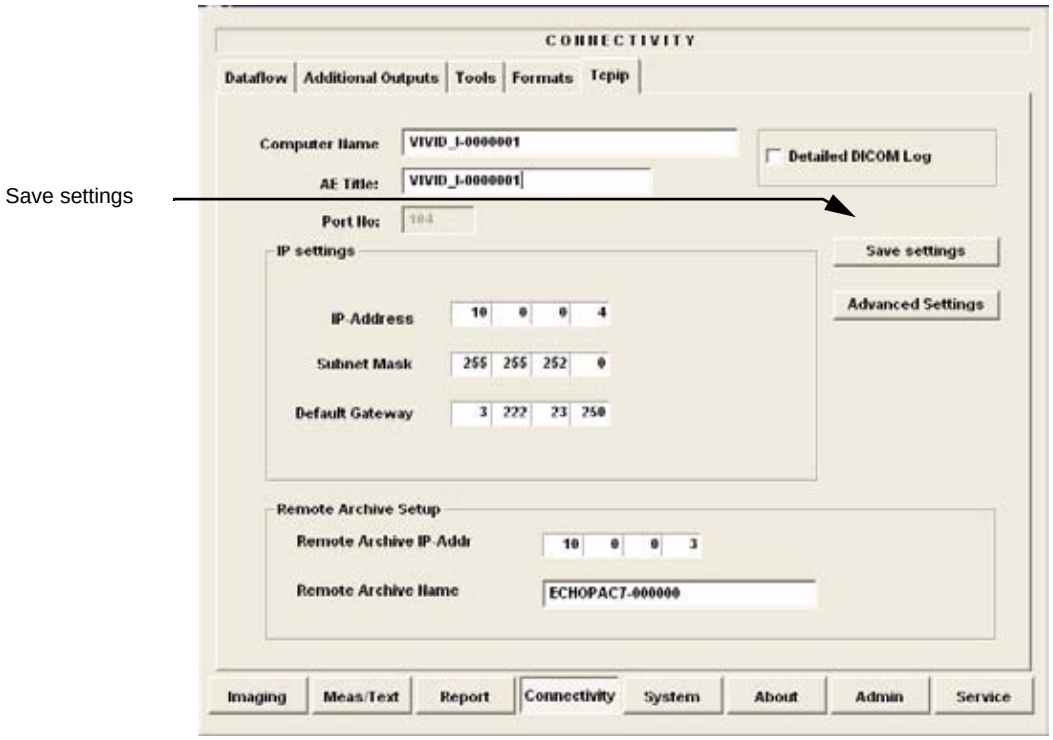


Figure 3-111 Save New TCP/IP settings

The new settings are saved to a common settings file. After a restart, the settings are also included in other screens.

2.) Restart the Vivid-i™/ Vivid-q™ system to activate the changes.

3-8-3-8 Configuring the Vivid-i™/ Vivid-q™ and Network PC for a Peer-to-Peer Connection

NOTE: The following steps are performed on the Vivid-i™/ Vivid-q™ scanner.
The instruction Select = trackball to the specific item and press the Set button on the control panel.

1.) On the Vivid-i™/ Vivid-q™ control panel, press the **Config** button.
2.) From the System Configuration window, click the **Connectivity** tab at the bottom of the window.

The Connectivity dialog box opens.

3.) Select the **TCPIP Tab.**
4.) Trackball to the **Advanced** tab and press the **Set** button on the control panel.

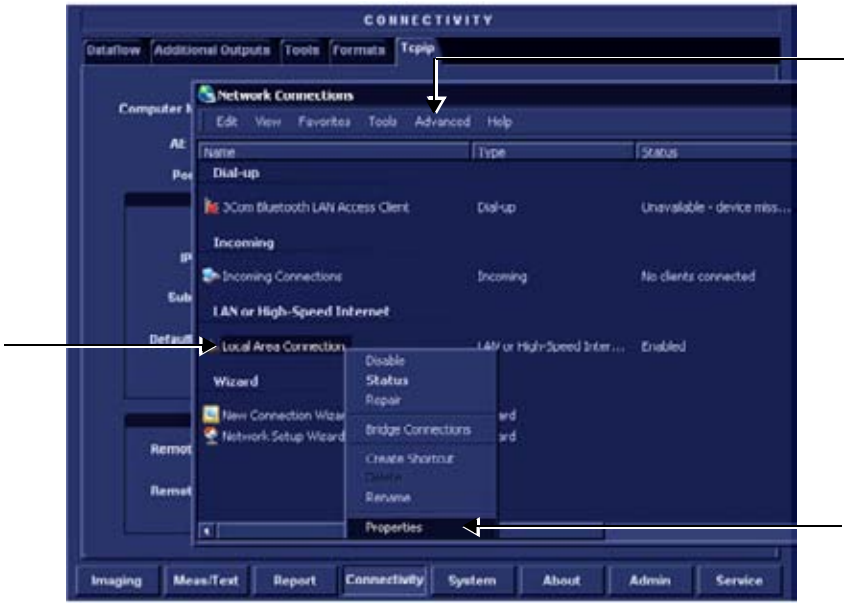


Figure 3-112 Connectivity Dialog Box - TCPIP Advanced Tab

5.) Select the **Local Area Connection**, as shown in Figure 3-112.
6.) Press the **Menu** button on the control panel.
7.) From the drop-down menu, select **Properties**.

The Local Area Connection Properties dialog box opens.

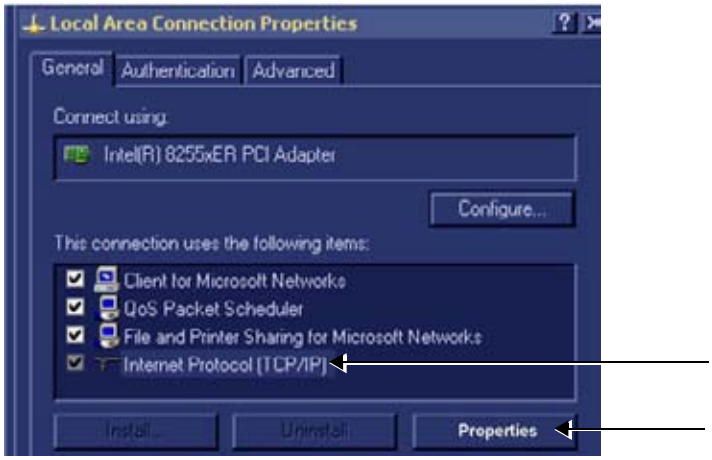


Figure 3-113 Local Area Connection Properties

8.) Select **Internet Protocol (TCP/IP)**.

9.) Click the **Properties** button.

The Internet Protocol (TCP/IP) Properties dialog box opens.

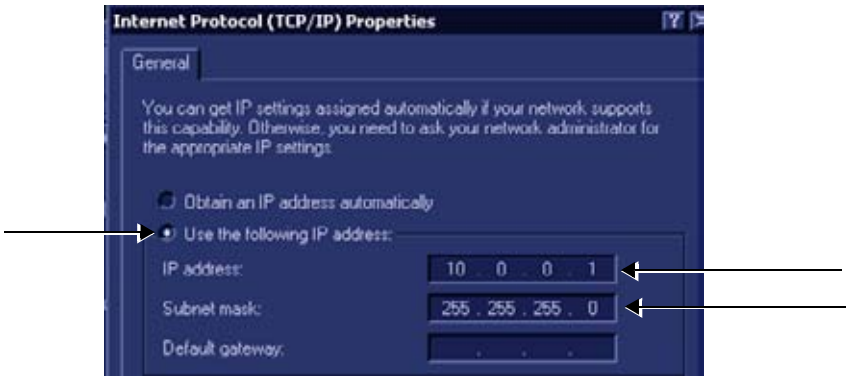

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 1
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

Figure 3-114 Internet Protocol (TCP/IP) Properties

10.) Activate the **Use the following IP address** check box.

11.) Type in the Vivid-i™/ Vivid-q™ **IP address 10.0.0.1**.

Note: The IP must be *different* from the IP address used for network computer.

12.) Type in the **Subnet mask 255.255.255.0.**

Note: The Subnet mask should be the *same* for both the network computer and the Vivid-i™/ Vivid-q™.

13.) Click **OK**

14.) Press the **Config** button on the control panel to close all windows and return to the regular scanning mode.

NOTE: The following steps are performed on the Network Computer.

1) On the network computer, access the Control Panel, as follows:

a.) Double-click on **My Computer** icon on desktop.

b.) Double-click on **Control Panel** icon.

2) Double-click on **Network Connections** icon.

3) Double-click on **Local Area Connection** icon.

The Local Area Connection Properties dialog box opens.

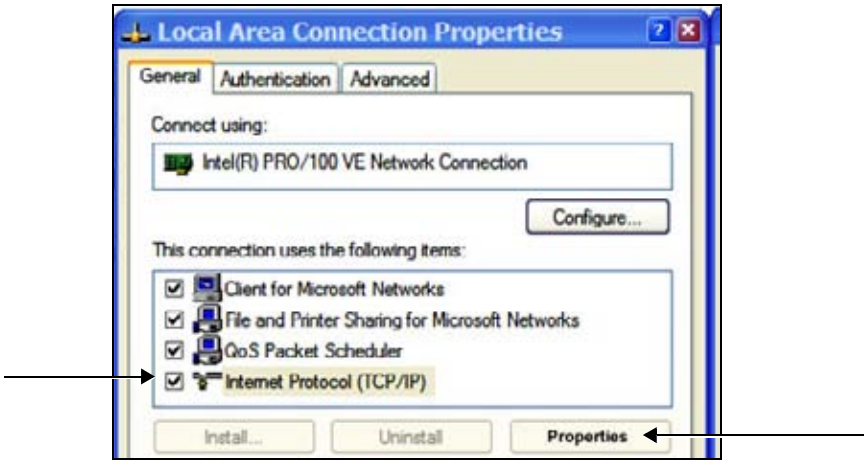


Figure 3-115 Local Area Connection Properties

4) Select **Internet Protocol (TCP/IP)**.

5) Click the **Properties** button.

The Internet Protocol (TCP/IP) Properties dialog box opens.

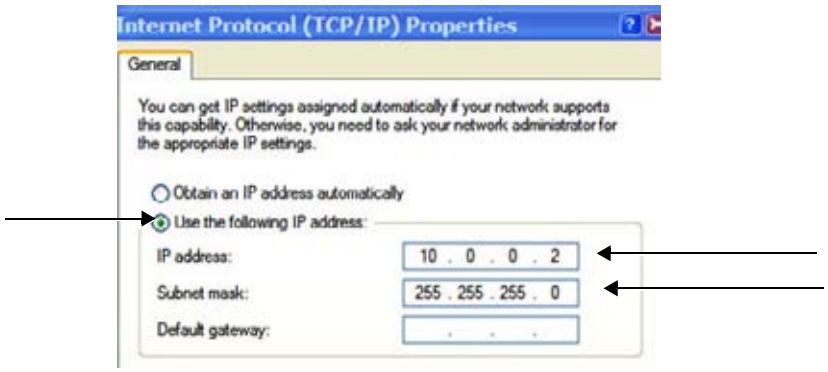

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

Figure 3-116 Internet Protocol (TCP/IP) Properties

6.) Activate the **Use the following IP address** check box.

7) Type in the network computer's **IP address 10.0.0.2**.

Note: The IP address must be *different* from the one used for the Vivid-i™/ Vivid-q™ system.

8) Type in the **Subnet mask 255.255.255.0**.

Note: The Subnet mask should be the *same* for both the network computer and the Vivid-i™/ Vivid-q™.

9) Click **OK**, close all windows and approve all changes. Return to regular mode.

10) Connect the Vivid-i™/ Vivid-q™ and network computer LAN connection using a cross over Network cable. (Normally with RED connector covers on both sides, cable not longer than 100 meters).

The Vivid-i™/ Vivid-q™ and the network computer are now ready for export, import of files.

Note: One can check the connection by pinging to the Vivid-i™/ Vivid-q™ IP, as follows:

a.) Select <**Start**>, <**Run**>

b.) Type **CMD**, then press <**Enter**>

c.) Type **Ping** and **IP 10.0.0.1** for Vivid-i™ or Vivid-q™ then press <**Enter**>.

If return timing is OK, you have an operating network connection.

3-8-3-9 Configuring the Vivid-i™/ Vivid-q™ and Network PC for a LAN Connection

NOTE: The following steps are performed on the Vivid-i™/ Vivid-q™ *scanner.*
The instruction Select = trackball to the specific item and press the Set button on the control panel.

1.) On the Vivid-i™/ Vivid-q™ control panel, press the **Config** button.

2.) From the System Configuration window, click the **Connectivity** tab at the bottom of the window.

The Connectivity dialog box opens.

3.) Select the **TCPIP Tab.**

4.) Trackball to the **Advanced** tab and press the **Set** button on the control panel.

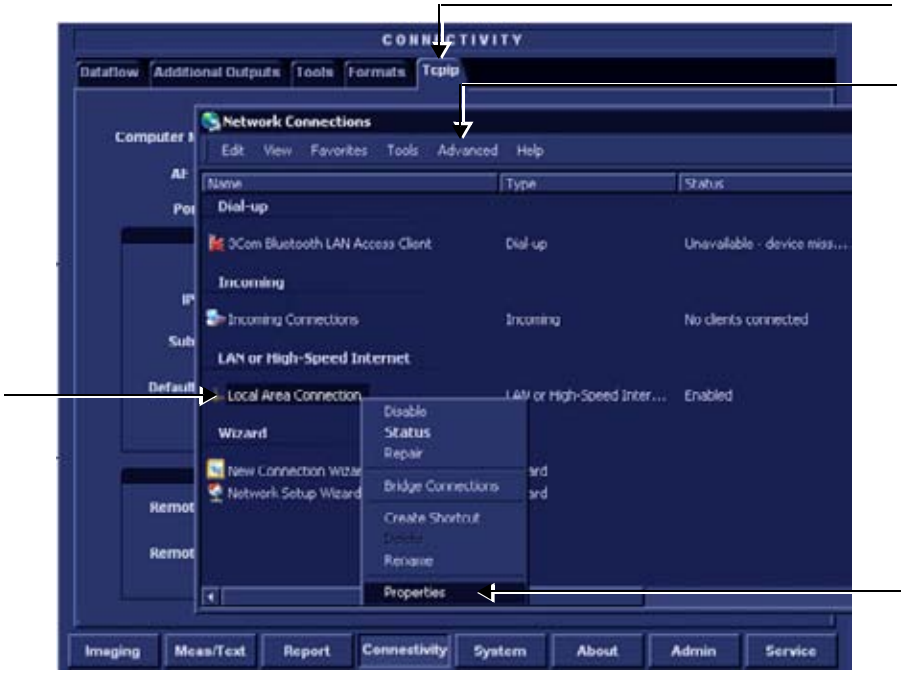


Figure 3-117 Connectivity Dialog Box - TCPIP Advanced Tab

5.) Select the **Local Area Connection**, as shown in Figure 3-112.

6.) Press the **Menu** button on the control panel.

7.) From the drop-down menu, select **Properties**.

The Local Area Connection Properties dialog box opens.

Figure 3-118 Local Area Connection Properties

8) Select **Internet Protocol (TCP/IP)**.

9) Click the **Properties** button.

The Internet Protocol (TCP/IP) Properties dialog box opens.

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 1
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

Figure 3-119 Internet Protocol (TCP/IP) Properties

10.) Activate the **Use the following IP address** check box.

11.) Type in the Vivid-i™/ Vivid-q™ **IP address 10.0.0.1** or the one provided by the local network administrator.

Note: The IP must be *different* from the IP address used for network computer.

12.) Type in the **Subnet mask 255.255.255.0** or the one provided by the local network administrator.

Note: The Subnet mask should be the *same* for both the network computer and the Vivid-i™/ Vivid-q™.

13.) Click **OK**

14.) Press the **Config** button on the control panel to close all windows and return to the regular scanning mode.

NOTE: The following steps are performed on the Network Computer.

1) On the network computer, access the Control Panel, as follows:

   a.) Double-click on **My Computer** icon on desktop.

   b.) Double-click on **Control Panel** icon.

2) Double-click on **Network Connections** icon.

3) Double-click on **Local Area Connection** icon.

   The Local Area Connection Properties dialog box opens.

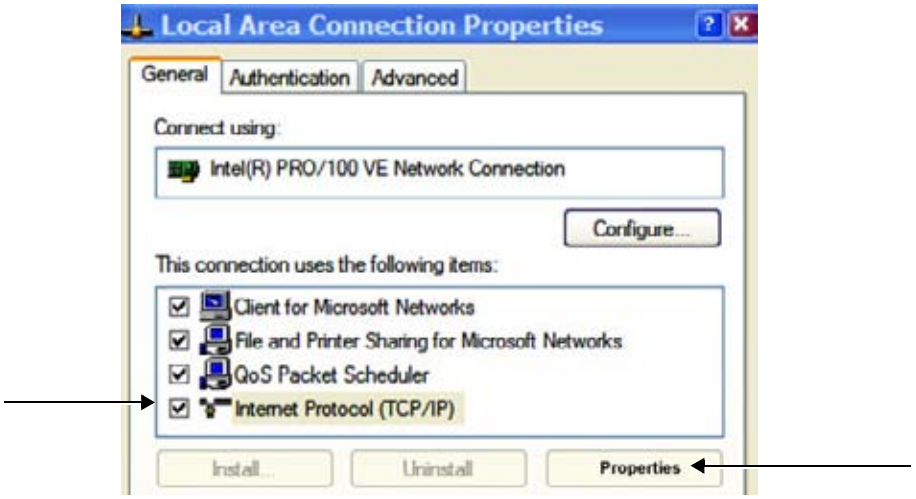


Figure 3-120 Local Area Connection Properties

4) Select **Internet Protocol (TCP/IP)**.

5) Click the **Properties** button.

The Internet Protocol (TCP/IP) Properties dialog box opens.

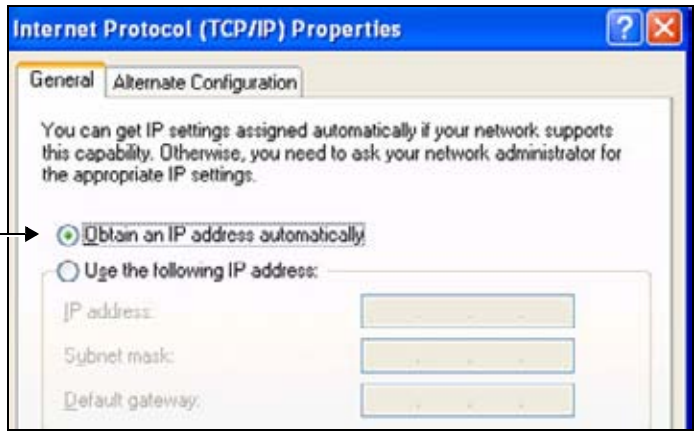

Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:

Figure 3-121 Internet Protocol (TCP/IP) Properties

6.) Activate the **Obtain an IP address automatically** check box.

7) Click **OK**, close all windows and approve all changes. Return to regular mode.

8) Connect the Vivid-i™/ Vivid-q™ and network computer LAN connection using a regular Network cable.

The Vivid-i™/ Vivid-q™ and the network computer are now ready for export, import of files.

Note: One can check the connection by pinging to the Vivid-i™/ Vivid-q™ IP, as follows:

a.) Select <**Start**>, <**Run**>

b.) Type **CMD**, then press <**Enter**>

c.) Type **Ping** and **IP 10.0.0.1** for Vivid-i™/ Vivid-q™ then press <**Enter**>.

If return timing is OK, you have an operating network connection.

3-8-4 Set Up Connection to a DICOM Server in a Network

In this case, the Vivid-i™/ Vivid-q™ is configured to work with a DICOM server in a network environment. Images are first saved on the local image buffer on the scanner. At the end of the examination, the images are sent to the DICOM server via a DICOM spooler.

This scenario requires that the scanner is configured to be connected to the DICOM server as described below.

3-8-4-1 Overview

To work against the DICOM server, the following information has to be entered in the scanner:

- DICOM server IP address, subnet mask and eventually the gateway.
- DICOM server port number.
- DICOM server AE title (the server application's name).
- Name of Device.

3-8-4-2 DICOM Server IP Address Setting on the Scanner

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in Log On to the System as ADM on page 4 - 11.

2.) Select CONNECTIVITY (in the lower part of the window).

3.) Select the DATAFLOW tab.

4.) Select the arrow to the right of the Name field to list all dataflows in a pull-down menu, see Figure 3-122.

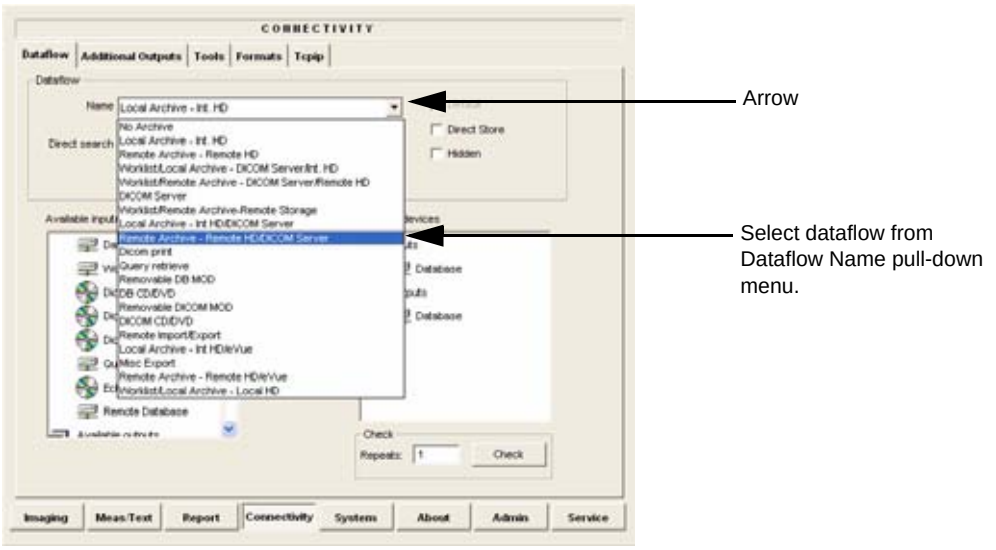


Figure 3-122 Select Dataflow

5.) From the Dataflow Name pull-down list, select the dataflow you want to configure - see Figure 3-122.

The selected flow is shown, as seen in the example in Figure 3-123 below (Worklist/Local Archive - DICOM Server/Int. HD).

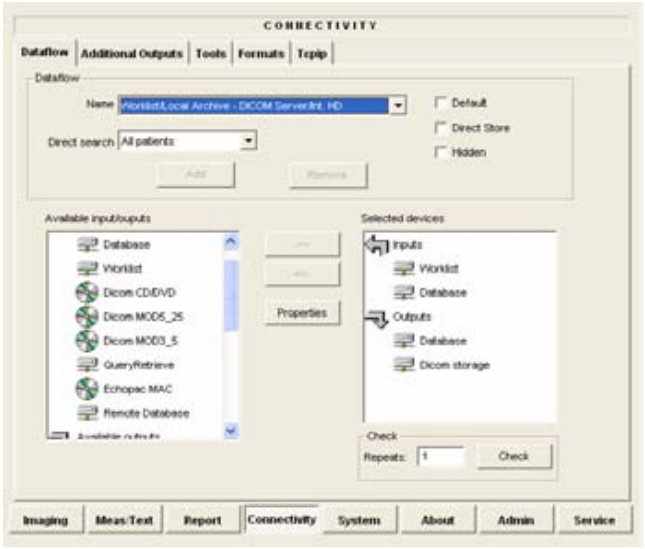


Figure 3-123 Worklist/Local Archive - DICOM Server/Int. HD Flow

6.) Select **Worklist** (so it is highlighted) and then select **Properties** to display the Properties dialog.

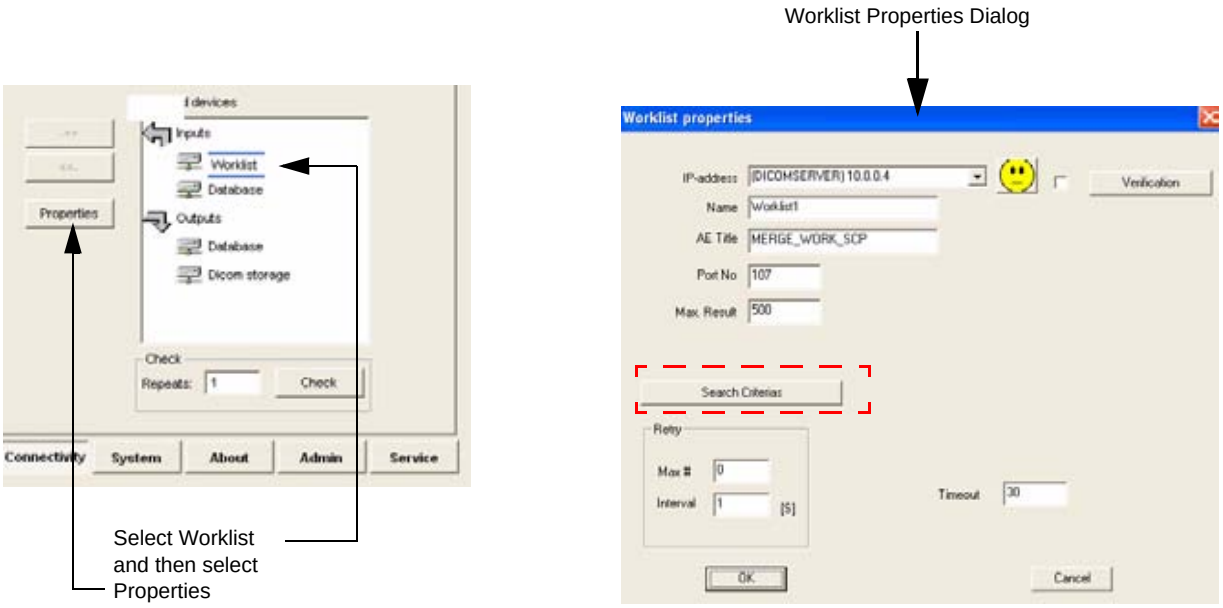


Figure 3-124 Select Worklist Properties Dialog Box

7.) Click on "**Search Criterias**" (Figure 3-124).

The Search Criterias window opens (Figure 3-124).

8.) Highlight the modality filter in the list and click on **"Remove"** (see Figure 3-124).

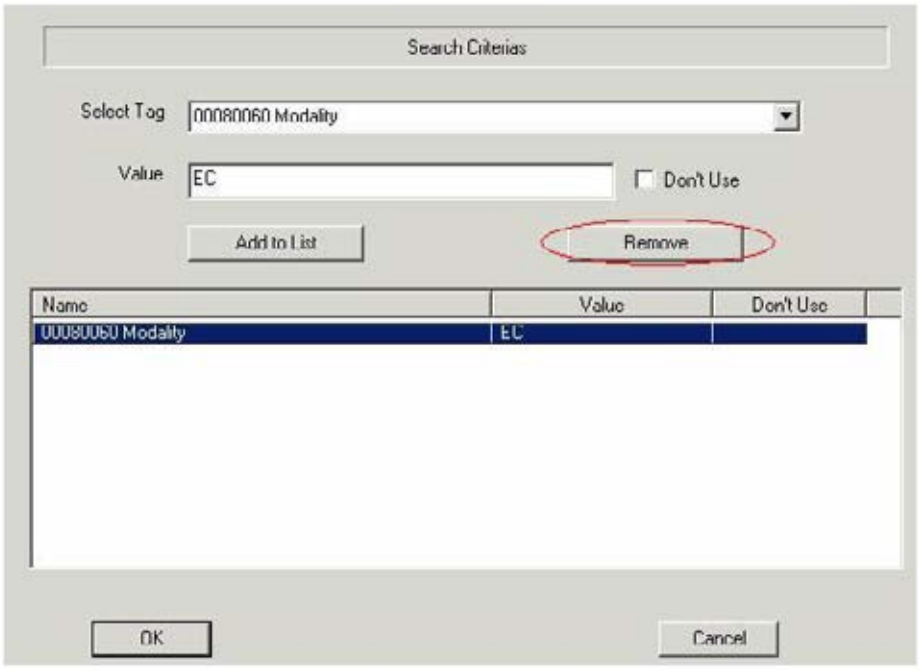


Figure 3-125 Search Criterias Window

9.) In the Select Tag drop down menu select "**00080060 Modality**".

10.) Type **US** in the Value text box and click on **"Add to List".**

The Search Criterias window is updated (see Figure 3-125).

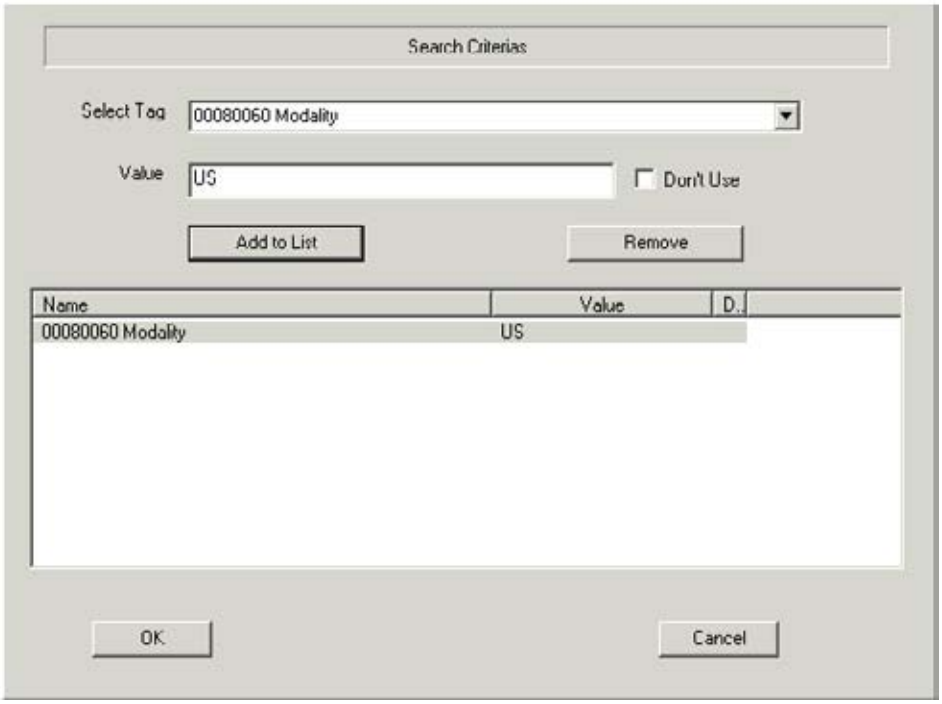


Figure 3-126 Search Criterias Window - Updated

11.) Click **OK** to close the window.

12.) From the *Worklist Properties* Dialog, select the IP-Address down-arrow to choose the Worklist Server from the pull-down menu.

NOTE: It is not possible to change the setting in the IP-Address field by editing it. See description below, starting with step 13, to change the setting.

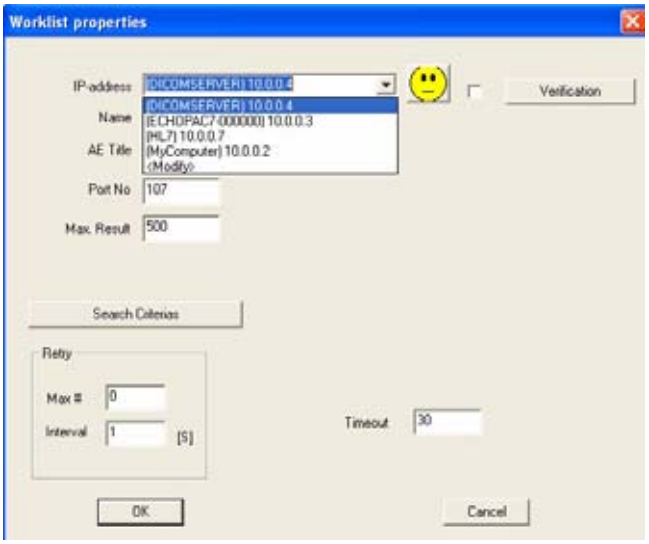


Figure 3-127 DICOM Server's Properties Dialog Box

13.) Follow the steps below to change the IP-Address settings:

a.) From the IP-Address pull-down menu, select <**Modify**> to display the IPs dialog box.

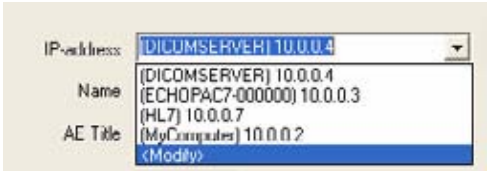


Figure 3-128 Select <Modify>

b.) From the IPs dialog box, select the server you want to modify, then select **Modify**.

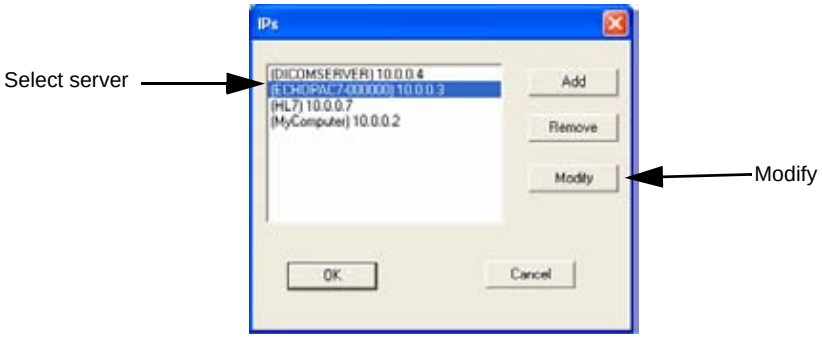


Figure 3-129 Select the Unit to Modify

c.) Edit the name and/or the IP address of the server, see Figure 3-130.

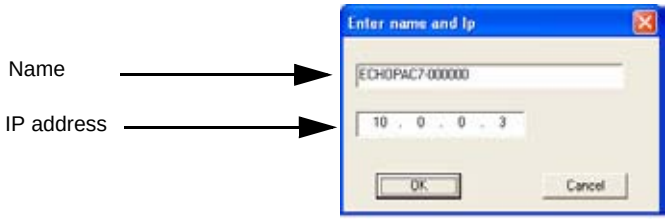


Figure 3-130 Edit Name and/or IP address

d.) Click **OK** to save the new settings and close the Edit Name dialog box.

e.) Click **OK** to close the IPs dialog to return to the Properties dialog box.

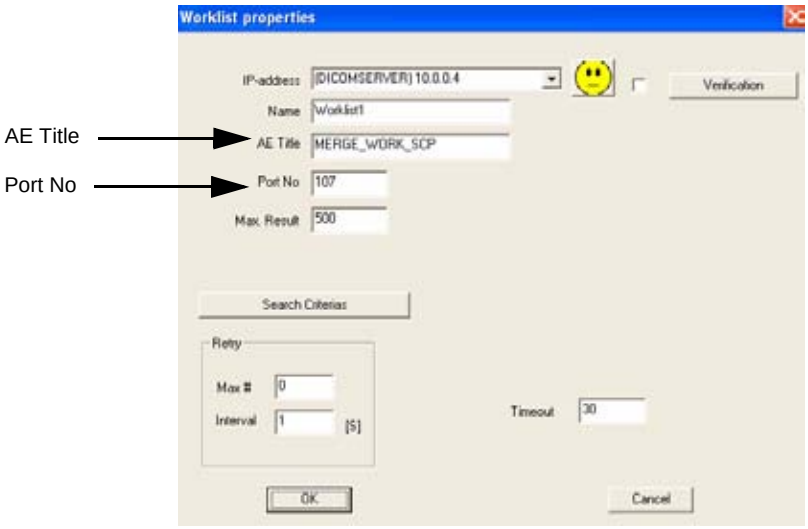


Figure 3-131 DICOM Server's Properties Dialog Box

f.) Enter the DICOM server AE Title. This entry is case-sensitive and must match exactly.

g.) Enter the DICOM server port.

h.) For some DICOM Servers, the default Time-out setting (30) is too low. Change if necessary by typing a new value (seconds).

i.) Click **OK** to close the Worklist Properties dialog box and save the changes.

3-8-4-3 Verify the Connection to a Device

1.) Select (highlight) the device to which you want to verify the connection.

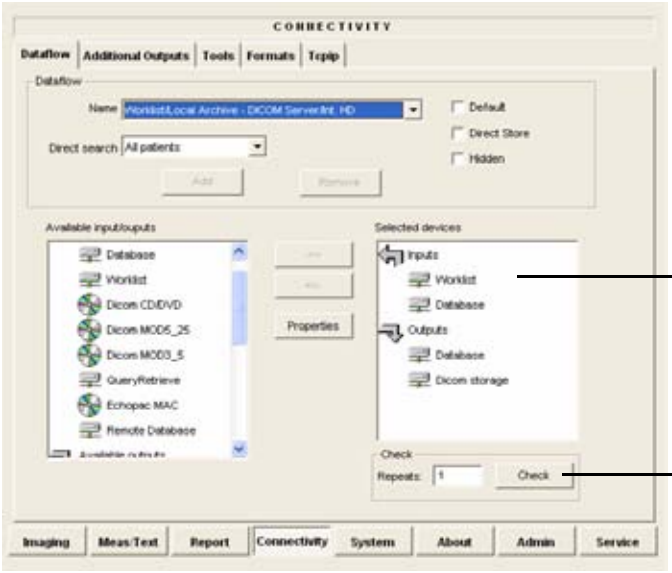


Figure 3-132 Verify Connection to a Device

2.) Select CHECK to start the connection to the device verification process.
The verification process may require up to one minutes. When done, a sign (prefix) displayed in front of the listed device indicates whether the test passed (green check-mark) or failed (red X).

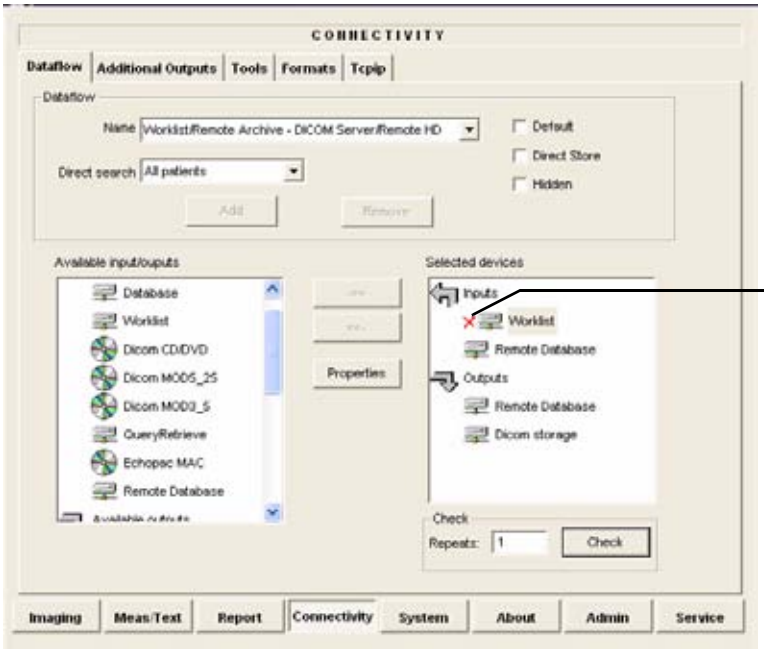


Figure 3-133 Verification Result

3-8-5 Setup Connection to HL7 Server in a Network

3-8-5-1 Introduction

The procedures below describe how to set up the Vivid-i™/ Vivid-q™ workstation so it can connect to the Hospital Information System (HIS), via the Vivid HL7 Gateway. By connecting to the HIS, demographic information (i.e. *Patient ID*, *Name*, *Gender, etc*.) can be retrieved from the HIS, reducing "double-work" and typing errors. Patient Reports can be sent back to the HIS for storage, together with the rest of the Patient records.

3-8-5-2 Preparations

1.) Before you can set up the HL 7 Communication, you need to collect some information:
- The IP address of the Vivid HL7 Gateway
- Port Number used by the Vivid HL7 Gateway (Default port: 3320)

Typically, source for this information is the Mitra support personnel.

The Connectivity Installation Worksheet on page 2 - 10 can be used for gathering this information.

2.) Provide the computer name of each EchoPAC PC Workstation and Vivid-i™/ Vivid-q™ being configured to the Mitra support personnel.

3-8-5-3 Configuration of Modality Worklist Services

Identify Dataflow to be Used

1.) Identify which dataflow is to be used at the site. If the DICOM Modality Worklist will be used, then the dataflow must include a Worklist service.
2.) On the Connectivity screen, select the **Dataflow** tab.
3.) From the pull-down menu, select the name of the site's dataflow.
4.) In the *Services* section, locate the **Worklist** service.
5.) Record the service's name and destination device.

Configure the DICOM Worklist Service

1.) Select the **Services** tab.
2.) Select the Worklist destination device from the pull down menu.
3.) Enter the IP address of the Vivid HL7 Gateway.
4.) Enter a descriptive name in the Name field.
(Example: Vivid HL7 Gateway. The use of this field is optional).
5.) Enter AE Title. Use the Computer Name for the unit you are configuring.
6.) Enter Port Number. (Port 3320 is the default, but Mitra may have provided another port number).
7.) Set Time-out to 90.
8.) Leave the rest of the fields unchanged.

Configure the Search Criterias

NOTE: This configuration is required.

1.) Click the **Search Criterias** button.
2.) Select the criteria **Modality** and click the **Remove** button.

3.) Press the **OK** button.

Configure Search Criteria: Constrain Query by AE Title

NOTE: This configuration is optional. It should only be performed if the site is directing orders to the Vivid-i™/ Vivid-q™ *that is scheduled to perform the study.*

Please contact the Mitra support personnel to verify that this step is needed.

1.) In the *Search Criterias* dialog box, select **00400001 Scheduled Station AE Title** from the *Select Tag* pull-down menu.
2.) Enter the Vivid-i™/ Vivid-q™ computer name for the Value.
3.) Click the **Add to List** button.
4.) Click the **OK** button.

Configure Search Criteria: Constrain Query by MRN

NOTE: This configuration should be performed if the site will need to constrain the Worklist queries by MRN (patient id)

1.) In the *Search Criterias* dialog box, select **00101000 Other Patient IDs** from the *Select Tag* pull-down menu.
2.) Enter a 9 digit number for the Value.
3.) Click the **Add to List** button.
4.) Click the **OK** button.

Assign DICOM Worklist name to Dataflow

1.) Select the Dataflow tab.
2.) From the *Dataflow name* pull-down menu, select the Dataflow which will be used.
3.) Remove the DICOM Worklist service currently used in the Dataflow.
4.) From the *Select Service* pull-down menu, select the **Gateway Modality Worklist** service.
5.) Click the **Add** button.
6.) Ensure that the service is displaying the value **In** for the Dir parameter and that its role is **Primary**.

Test Connectivity with the Vivid HL7 Gateway

The purpose of this test is to verify that the Vivid-i™/ Vivid-q™ has connectivity with the Vivid HL7 Gateway.

1.) From either the Current or Dataflow view, expand the Dataflow incorporating the Gateway Modality Worklist service.
2.) Expand the Gateway destination device.
3.) Select the **Gateway Modality Worklist** service.
4.) Click the **Check** button.
- If connectivity was achieved, then a green check should be displayed next to the name of the Gateway's Modality Worklist service.
- If connectivity was not achieved, then there will be a red X next to the name of the Gateway's Modality Worklist service.

Troubleshoot Connectivity with the Gateway

If connection between the Vivid-i™/ Vivid-q™ and the HIS failed, the following are typical causes:

1.) No network connection.

2.) IP address and/or port number was incorrectly entered when configuring the Gateway Modality Worklist service.

3.) Mitra support personnel have not yet configured the Gateway to accept Modality Worklist queries from the Vivid-i™/ Vivid-q™.

Verify that the Vivid-i™/ Vivid-q™ computer name matches the value specified for the Gateway Modality Worklist service and that it also matches the value supplied to the Mitra support personnel.

Configure the Export to HL7 Path

1.) Enter the configuration screen for the EchoPAC PC.
2.) Press the **Connectivity** button.
3.) Select the **Tools** tab.
4.) In the section labeled *Export Paths*, make the following changes:
   a.) For the Export To HL7 path, enter the following information:
   \\ < Name or IP Address of the Vivid HL7 Gateway>\POLL_DIR
   Example: \\Gateway\POLL_DIR
   b.) Verify that Text is select for the Export file format.

Test Connectivity with the Vivid HL7 Gateway

1.) Start a new study and acquire an image, or use an existing study.
2.) In the Measurements mode, make some of the measurements.
3.) In the Report screen, create and store a report.
4.) In the Patient screen, from the Examination List, select the study in which you created the report.
5.) From the *More* pull-down menu, select **HL7 Results**.

   If the export was successful, the following message is displayed:
   Export exam status: OK.

   If the export was unsuccessful, the following message (or similar) is displayed:
   Export exam status: Unable to copy file.

Troubleshoot Connectivity with the Vivid HL7 Gateway

If Connectivity with the Vivid HL7 Gateway failed, the following are typical causes:

1.) Path provided in Export to HL7 export path was incorrect.
2.) Mitra support personnel did not create the user account for the Vivid-i™/ Vivid-q™.
3.) The POLL_DIR directory on the Vivid HL7 Gateway was not shared or the permissions are incorrect. Verify with Mitra support personnel.
4.) Domain or other network issue.
5.) If Report files (ReportXXX.chm) are not exported to the Vivid HL7 Gateway, then the reports may not have been stored when they were created on the Vivid-i™/ Vivid-q™.

3-8-6 Query/Retrieve (Q/R) Setup

3-8-6-1 Overview

The Query/Retrieve function makes it possible to search for and retrieve DICOM data from a DICOM server for further analysis on the Vivid-i™/ Vivid-q™.

3-8-6-2 Query/Retrieve Setup on the Vivid-i™/ Vivid-q™

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in Log On to the System as ADM on page 4 - 11.

2.) Select **Connectivity**.

3.) Select **Dataflow**.

4.) Select **Query Retrieve** from the *Name* pull-down menu - see Figure 3-136 on page 3-129.

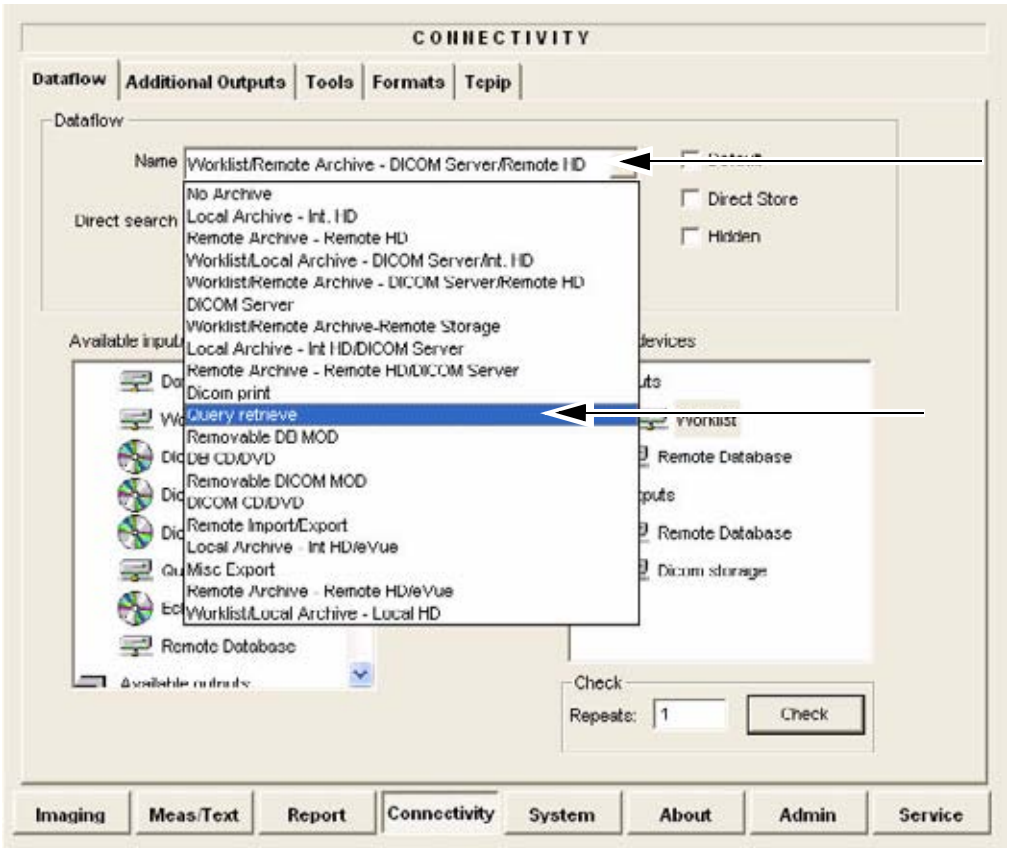


Figure 3-134 Select Query Retrieve

The selected dataflow (Query/Retrieve), is displayed as shown in Figure 3-135.

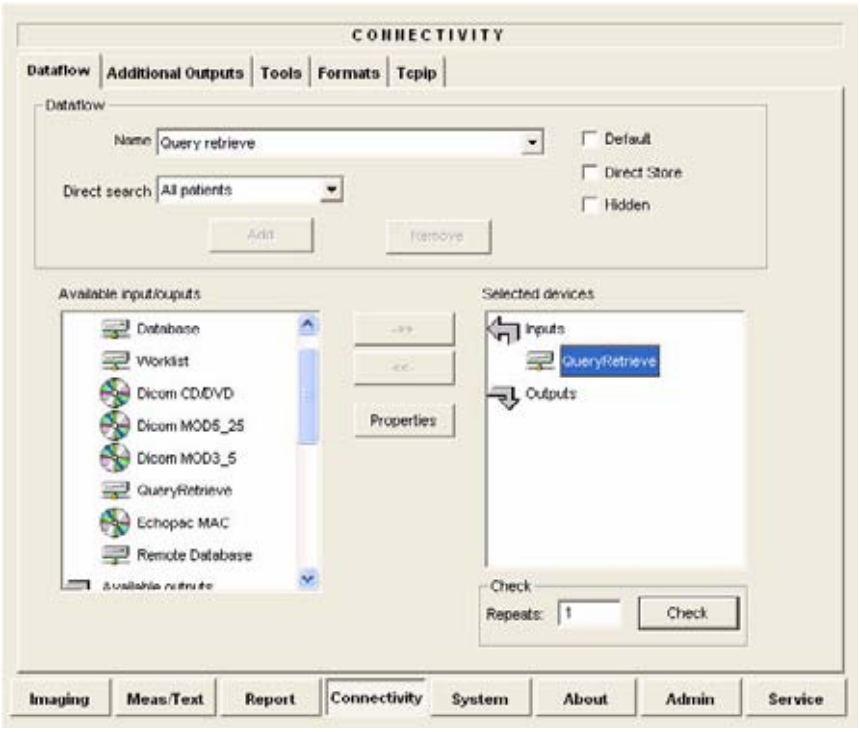


Figure 3-135 Query/Retrieve Workflow

5.) Select **QueryRetrieve** so it is highlighted and then select **Properties** to display the Properties dialog box.

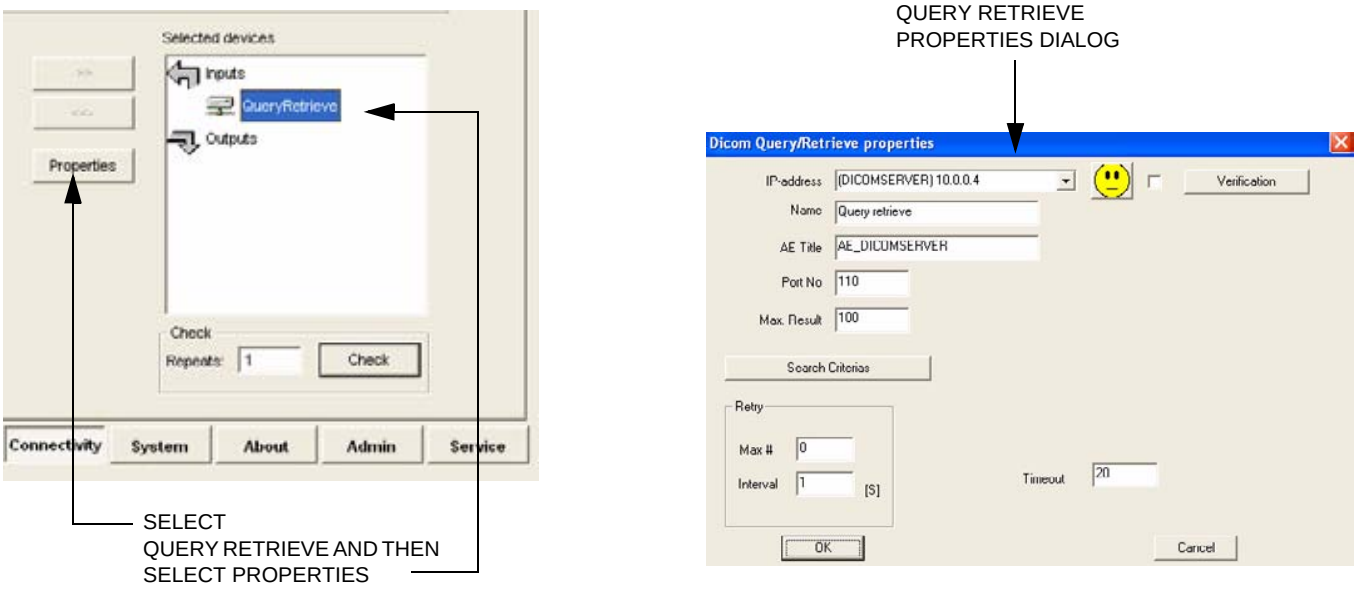


Figure 3-136 Select Query/Retrieve's Properties

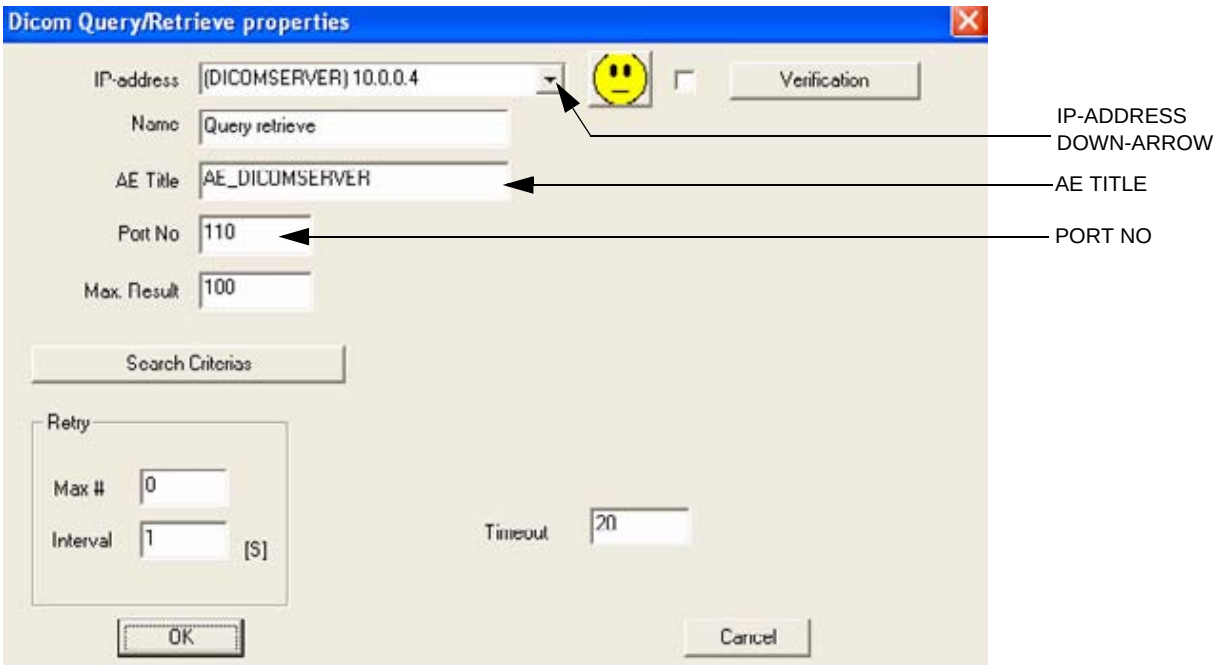


Figure 3-137 DICOM Query/Retrieve properties

6.) Select the IP-address down-arrow to choose the DICOM Query/Retrieve server from the pull-down menu. In some cases, the server to use is the same as used for DICOM Storage.

If the server to use is missing from the list, select <**Modify**> from the pull-down menu and edit the setup for one of the predefined servers.

7.) Enter the correct AE Title and Port Number for the DICOM Query/Retrieve server in the respective fields in the Query/Retrieve screen.

Change Search Criterias

It is possible to set up special Search Criterias for DICOM Query/Retrieve. In most cases you may leave the Search Criterias as is, and skip this adjustment.

Follow the steps below to change the Search Criterias parameters:

1.) Select Search Criterias

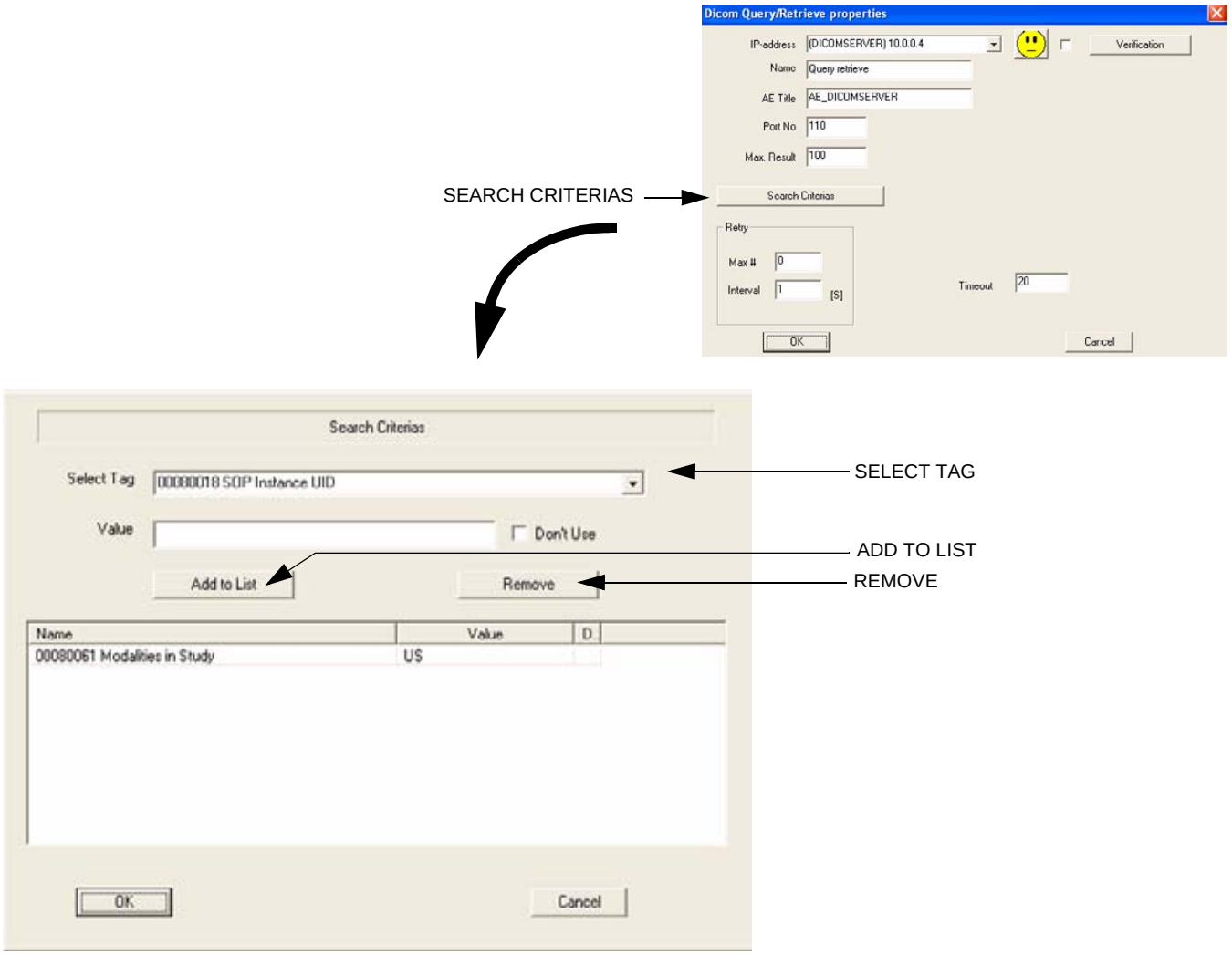


Figure 3-138 Select Search Criterias

2.) Select the correct tag from the *Select Tag* pull-down menu.

3.) If needed, type in the value.

4.) Select **Add to List**.

5.) Click **OK** to close the Search Criterias window.

3-8-6-3 Query/Retrieve Verification

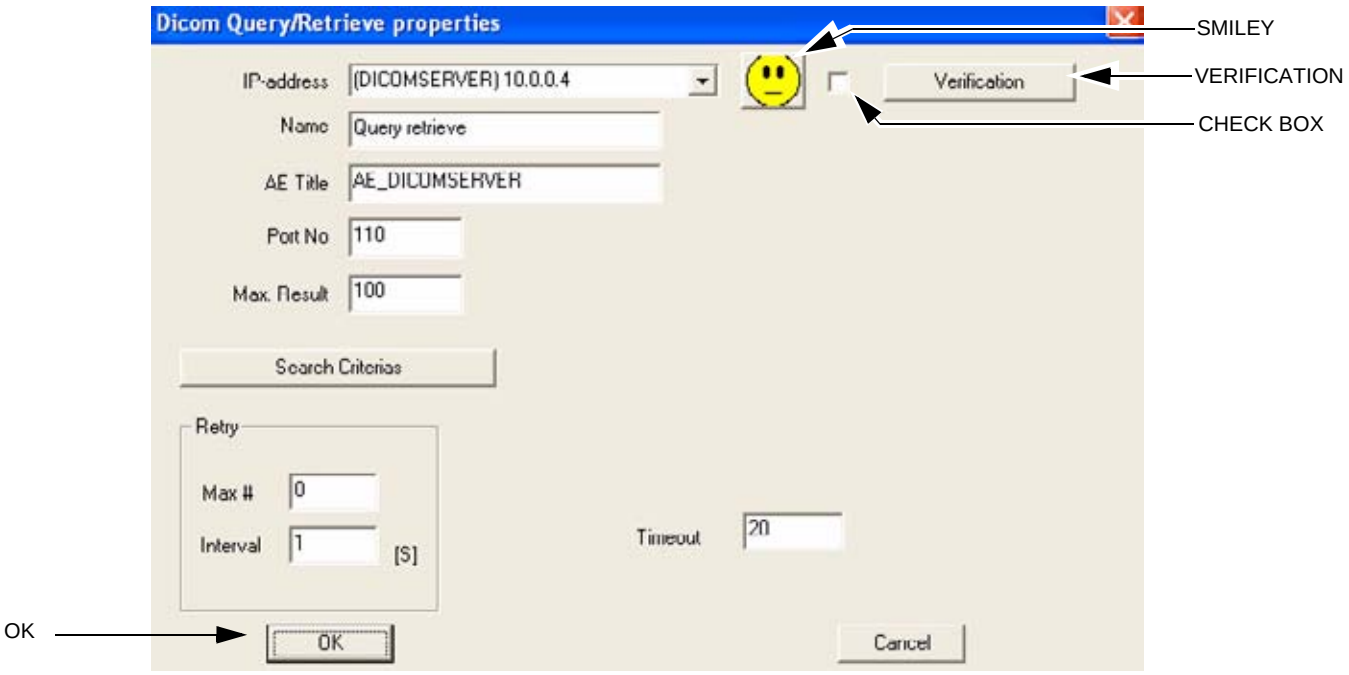


Figure 3-139 DICOM Query/Retrieve Properties

Follow the Steps Below to do a First Test (Ping) of the Connection

1.) Select the Smiley button to Ping the server.

2.) If the network connection to the server is OK, it will be illustrated by a smiling Smiley .
A sad Smiley indicates that the network connection is failing.
Typical cause: Network cable not connected.

3.) When ready, click **OK** to close the DICOM Query/Retrieve properties and save changes.

Follow the Steps Below to Test the DICOM Query/Retrieve Workflow

NOTE: This check uses both Ping and DICOM Ping.

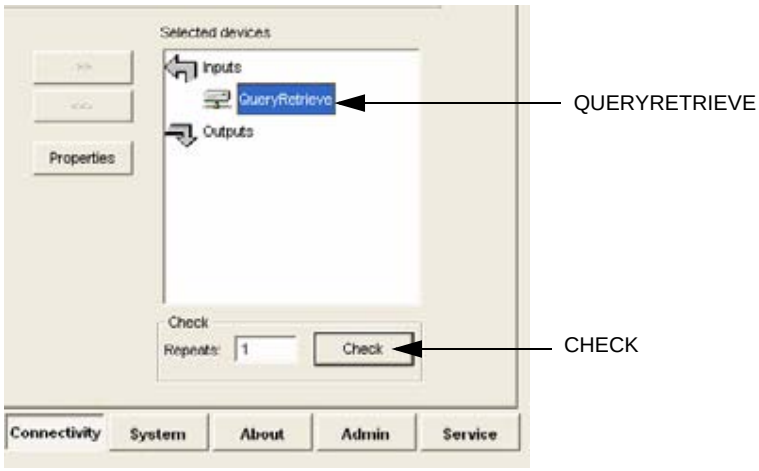


Figure 3-140 Check the DICOM Query/Retrieve Workflow

1.) Select **QueryRetrieve** from the Selected devices list.

2.) Select **Check**.

- If the test passes, a pop-up dialog is displayed, see left illustration in Figure 3-141.

  Select **OK** to continue. A green check mark to the left of the Selected devices indicates that the test passed successfully.

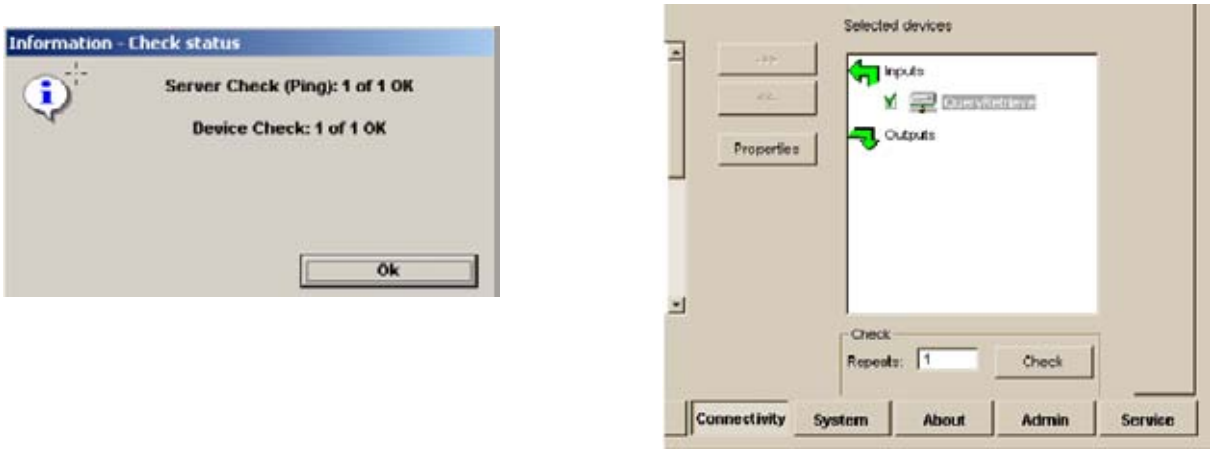


Figure 3-141 Test (Check) Passed

- If the test fails, a pop-up warning is displayed, see left illustration in Figure 3-142.

  Select **OK** to continue. A red “X” to the left of the Selected devices indicates that the test failed.

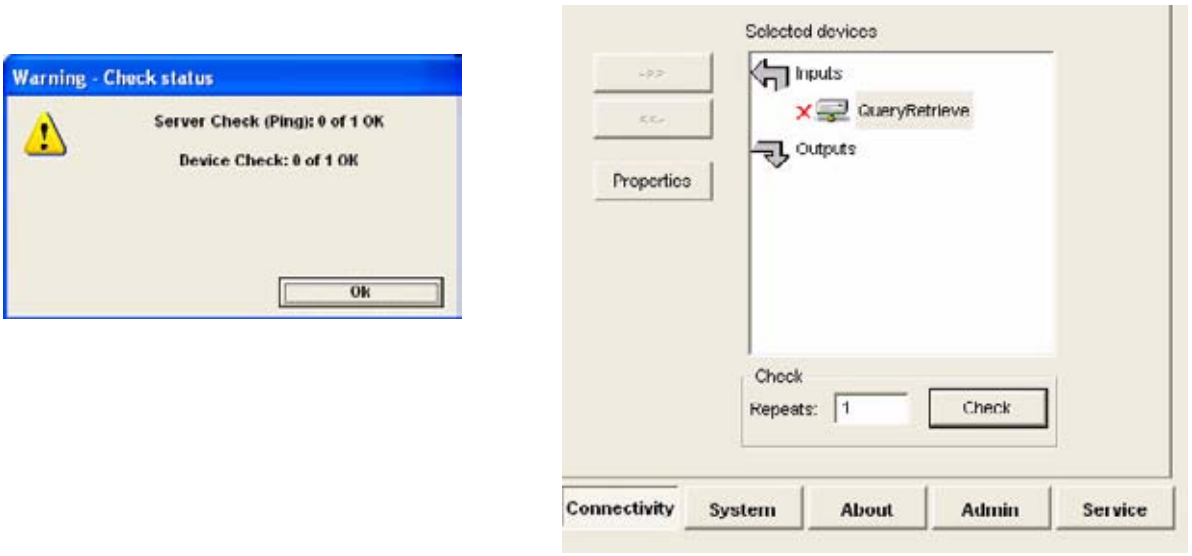


Figure 3-142 Test (Check) Failed

3-8-7 MPEGVue Export Configuration

3-8-7-1 Introduction

The procedures below describe how to set up the Vivid-i™/Vivid-q™ portable ultrasound scanner for MPEGVue export. This provides the user with the ability to export an entire patient exam into standard supported media (such as, CD, DVD, or USB Memory Stick [disk-on-key]) in standard MPEG or JPG format. The exported exam can later be read on any PC.

Media containing one or several patient exams in MPEGVue format is easily generated on the Vivid-i™/ Vivid-q™. When exporting data from the system for this purpose, the exported examination contains files in HTML, MPEG and JPG formats for all of the images in the exam. It also contains measurements and reports generated and saved during the exam; the reports are all saved as files in .CHM format.

Any media generated as MPEGvue also contains an embedded MPEGVue viewer, allowing the user to view it on any PC without having to install any additional software.

The exported exam may be viewed on any PC operating on Windows 2000, 2003, Windows XP or Windows Vista.

This can prove useful in many situations - for example, when sending patient data for a second opinion, for academic lectures, conferences, presentations, *etc*. Another way of using this feature is to directly provide the patient with an MPEGVue disk (CD or DVD) containing, for example, an OB exam.

3-8-7-2 Preparations

Obtain local IP addresses that will allow you to set up the system and the remote computer properly. This information is available from the local system administrator.

3-8-7-3 Configuring the Vivid-i™/ Vivid-q™ for MPEGVue Export

1) Press the **Config** (or **F2**) button and log on as *Adm*, as described in Log On to the System as ADM on page 4 - 11.

2.) Select **Connectivity**.

3.) Select **Dataflow**.

4) From the drop-down menu, select **Misc Export** - see Figure 3-143.

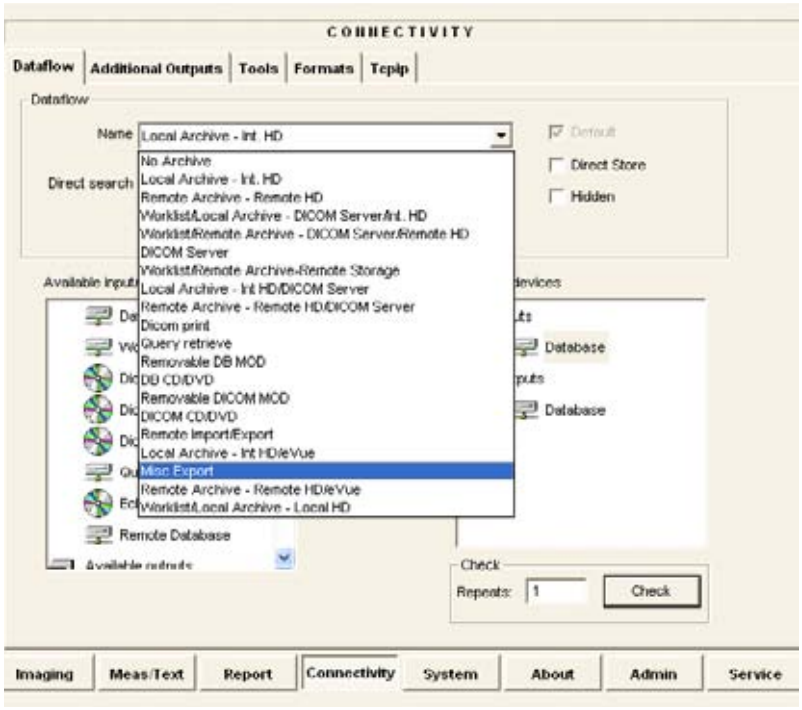


Figure 3-143 Dataflow - Misc Export

5) From selected output devices, highlight **evue** and then click the **Properties** button - refer to Figure 3-144 on page 3-137.

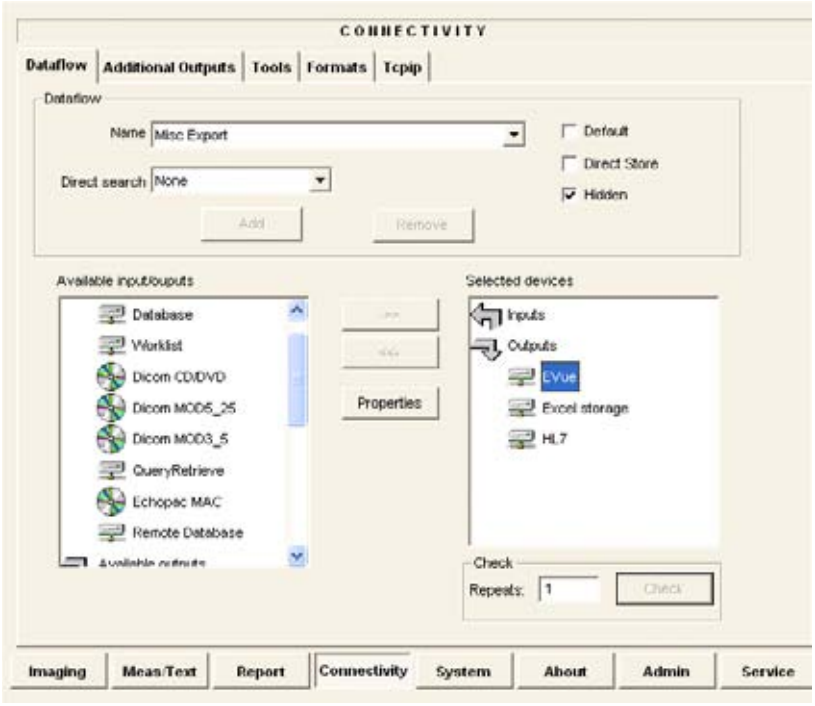


Figure 3-144 eVue Properties

The eVue Properties Dialog box opens:

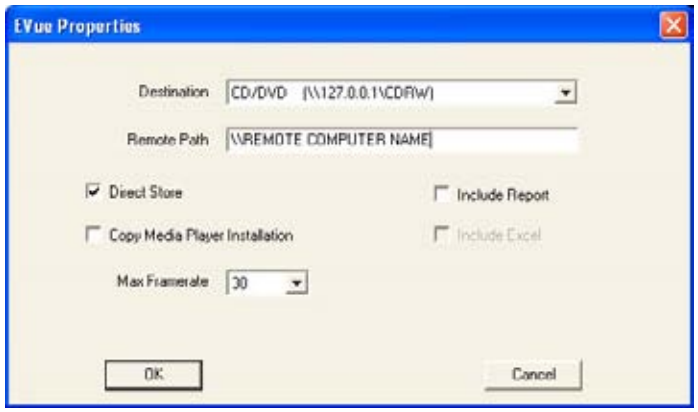


Figure 3-145 eVue Properties Dialog Box

6) In the *Remote Path* field, type in the path to which you want to export MPEGVue (when this feature is used).

Note: If the destination is a constant IP, you can type either the remote computer name or the remote computer's ID address in the *Remote Path* field.
After the path has been typed, it is available for selection from the Dataflow Name drop-down menu (or you can select an existing path from this menu).

7) Activate the **Copy Media Player Installation** check box.

Note: Step 7 is recommended for the first transfer of MPEGVue files. This step is not needed for Windows XP. After initial transfer of MPEGVue, it is recommended to disable this check box.

3-8-7-4 Exporting to MPEGVue

When exporting to MPEGVue, the Media can be one of the following supported types:

- CD
- MOD
- USB Memory stick (disk-on-key)

1.) Insert the required media into the appropriate drive (or USB port), when applicable.
2.) From the main screen, trackball to the **Patient** button and press **SET**.
3.) End the current exam (if still open), and select **Patient-List**.

The Patient List will be displayed with the following header:

4.) Trackball to the **Export** softkey in the bottom menu shown below and press **SET**.

The Export dialog box opens.

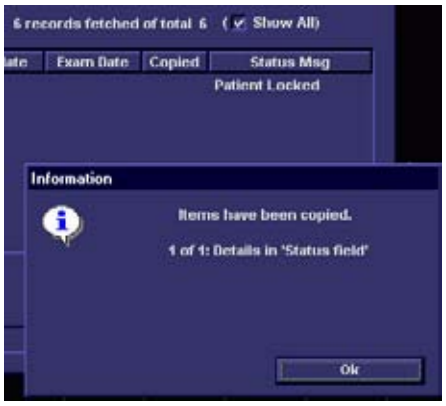
Figure 3-146 Export Dialog Box

5.) Under Export *To*: select **To MPEGvue** in the combo-box on the right, as shown in Figure 3-146.
6.) Click **OK**.

The Patient List screen is displayed with the following header:

7.) Trackball to the required Patient File and select it by pressing **SET**.
To select more than one Patient File from list, use the <Shift> key together with **SET**
8.) When ready, after the required Patients Files have been selected (highlighted,) press the **COPY** button.

The selected files will be converted and copied into the selected media. When done, the following message is displayed:



9.) If required, click **OK** then select any additional Patient Files for export.

10.) When export complete, click **OK** then remove the media containing the exported MPEGVue data from the Vivid-i™/ Vivid-q™ system.

Note: If any problems occurred with copying the Patient Files during the export process, an error message such as the one below will be displayed, showing the status of each of the transferred Patient Files.

3-8-8 eVue Dataflow Configuration

3-8-8-1 Introduction

It is possible to configure the Vivid-i™/Vivid-q™ portable ultrasound scanner to allow the user to send images or loops to a remote PC, in almost real time. When pressing Store, the loop will save not only to the local archive (in raw-data format), but will also be transmitted to a designated PC ("e-Vue PC") on the network (in compact MPEG format), and will appear at the review PC within a very short time.

This feature proves very useful in the OR scenario, where consultation with another doctor in the hospital ***in real-time*** is required.

3-8-8-2 Preparations

Before configuring the Vivid-i™/ Vivid-q™ for eVue dataflow, it is necessary to decide upon a specific PC in the hospital as being the e-Vue PC station. The service technician then configures the Vivid-i™/ Vivid-q™ to send images to that specific e-Vue PC, as described below.

3-8-8-3 Configuring the Vivid-i™/ Vivid-q™ for eVue Dataflow

1.) Verify which PC in the hospital/institute has been designated as the e-Vue station.

2.) Make sure the Vivid-i™/ Vivid-q™ is connected to the Network via cable or wireless.

3.) On the Vivid-i™/ Vivid-q™ scanner, press the **Config** button.

The System Configuration window opens.

4.) Click **Connectivity**.

The Connectivity dialog box opens.

5.) Select the **Dataflow** Tab, as shown in Figure 3-147 on page 3-141.

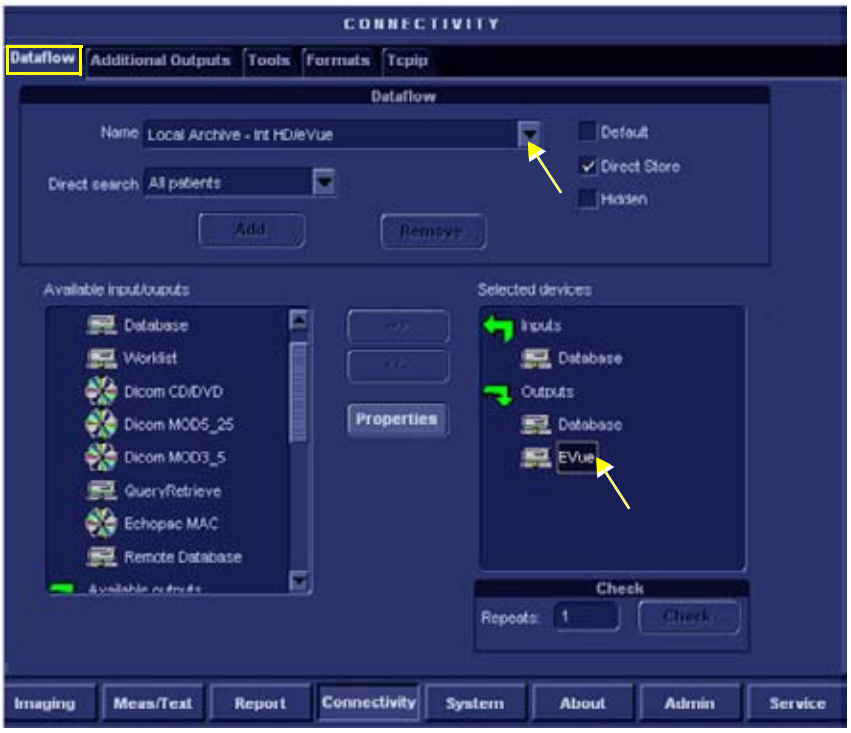


Figure 3-147 Connectivity - Dataflow Tab Selected

6.) Click on the **Name** field to access the drop-down menu.

7.) From drop-down menu, select the Dataflow named **Local Archive – Int. HD/eVue**.

8.) Trackball to the *Selected devices* window and select (highlight) **eVue** (see Figure 3-147).

9.) Trackball to the **Properties** button and press **SET**.

The eVue Properties dialog box opens.

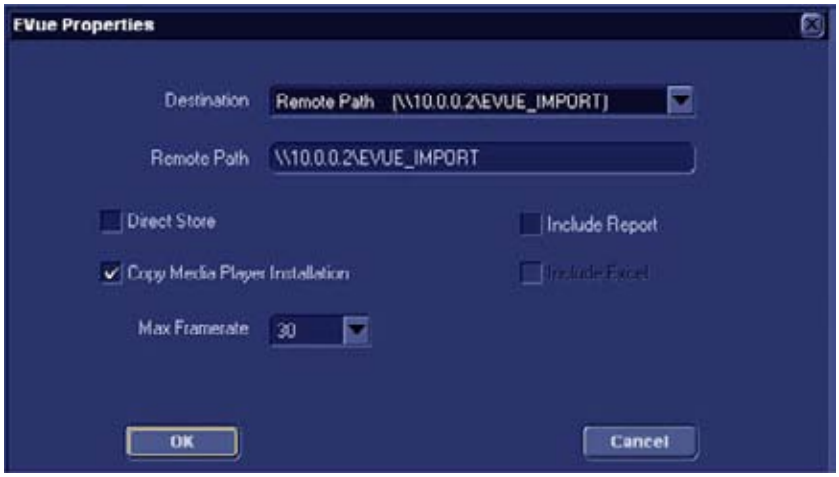


Figure 3-148 eVue Properties Dialog Box

10.) Trackball to the *Remote Path* field and type in the IP address and path of the remote computer: **\\10.0.0.2\EVUE_IMPORT**, or type in the remote computer full name **\\Name\EVUE_IMPORT** (refer to Figure 3-148).

11.) Trackball to the *Destination* field, open the drop-down menu and select **Remote Path (\\10.0.0.2\EVUE_IMPORT)**, or the computer name **\\Name\EVUE_IMPORT** (refer to Figure 3-148).

12.) Activate the **Copy Media Player Installation** check box.

Note: Step 12 is recommended for the first transfer of eVue files. This step is not needed for Windows XP. After initial transfer of eVue, it is recommended to disable this check box.

The Vivid-i™/ Vivid-q™ dataflow is set and ready for export/import of eVue files into a network computer.

From now on, whenever the Vivid-i™/ Vivid-q™ is used for scanning and the **Store** button is pressed, another person will be able to view the stored loop on the remote e-Vue PC (after a short transmission time).
When new loops arrive, the following message will be displayed at the bottom of the screen: "*New images have arrived - To view please refresh the screen using F5".*"

3-8-8-4 Using eVue

1.) On the Vivid-i™/Vivid-q™ portable ultrasound scanner, in regular scanning mode, press **Patient**.

When the following window is displayed, select **Create New Patient**.

The Search/Create Patient dialog box opens.

Figure 3-149 Search/Create Patient Dialog Box

2.) Type the patient's Last Name and ID in the appropriate fields (see Figure 3-149).

3.) Select the Dataflow you intend to use for this patient's information (in this case, select **Local Archive – Int HD/eVue** as shown in Figure 3-149).

4.) Using the soft key buttons, select CREATE PATIENT.

5.) Now start scanning. Each image you would like to store press the STORE button.

A few seconds after the Store button is pressed, images will be transferred into the remote computer (which was previously set as the destination - refer to Figure 3-148 on page 3-141).

6.) To proceed, follow to the instructions as described for Using MPEGVue Viewer on a Remote PC on page 3 - 160.

3-8-9 Using MPEGVue/eVue on a Remote PC

3-8-9-1 Installing MPEGVue on a Remote PC

IMPORTANT For systems running a software version earlier than 6.1.0 (build 109), the MPEGVue player is not compatible with Internet Explorer 7, therefore, do not upgrade Internet Explorer on your PC to this version. In the event that an upgrade has already been installed, following the instructions for rolling back to Internet Explorer 6 on Windows XP provided on the Microsoft site, as follows: http://www.microsoft.com/windows/ie/support/default.mspx

When a DVD/CD containing MPEGvue exams is placed into a DVD/CD drive on a remote PC, it should self-boot within a few seconds and display the Patient List.

The first time this is done on the remote PC there will be a one-time operation where the MPEGvue program will self-install. If the remote PC operating system is Windows XP the installation is automatic and, when completed, the Patient List on the DVD/CD will be displayed.

In the event that the remote PC operating system is Windows 2000, the auto-installation will display one of the messages shown below (see Figure 3-150 and Figure 3-151), requesting the user to download and install some drivers.

The requested drivers may be downloaded from the Internet, or, if the DVD/CD was pre-configured, those drivers will be located on the MPEGvue DVD/CD itself.

In addition to the above, the installation program will test the configuration of the remote PC and will display a message if any component on the computer is not within the required specifications.

NOTE: Only Windows 2000 and later supported.

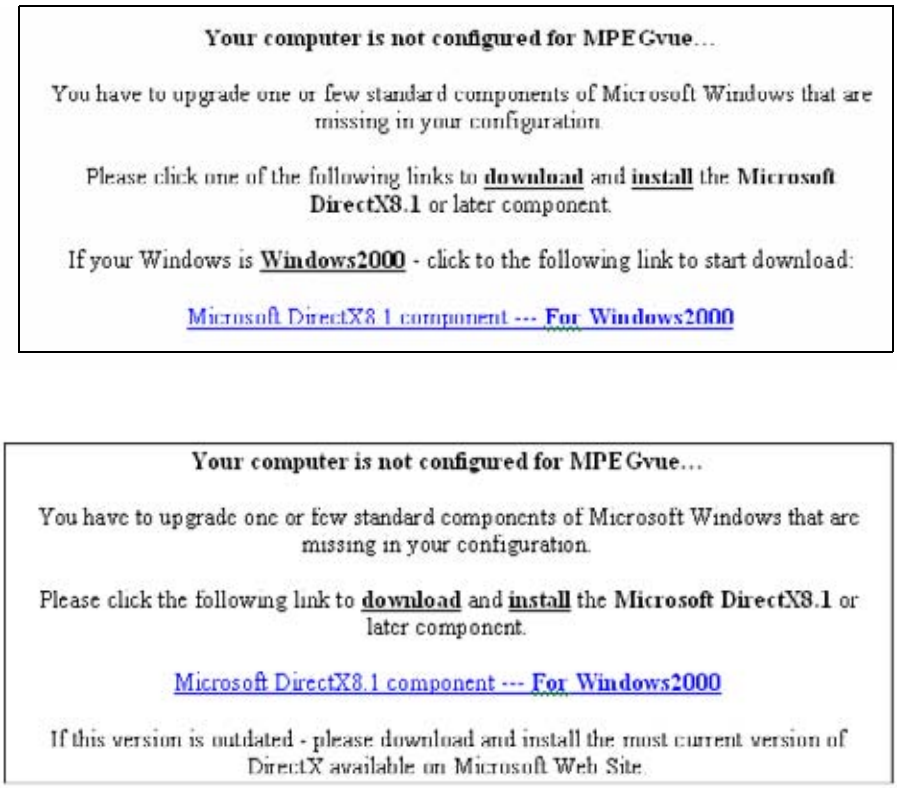

Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click one of the following links to download and install the Microsoft DirectX8.1 or later component.
If your Windows is Windows2000 - click to the following link to start download:
Microsoft DirectX8.1 component --- For Windows2000
Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click the following link to download and install the Microsoft DirectX8.1 or later component.
Microsoft DirectX8.1 component --- For Windows2000
If this version is outdated - please download and install the most current version of DirectX available on Microsoft Web Site.

Figure 3-150 Download/Installation Message Examples #1

Your computer is not configured for MPEGVue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click one of the following links to download and install the Microsoft Windows Media Player.
Windows Media Player 9 Series (for Windows 98 SE and Windows 2000)
If this version is outdated — please download and install the most current version of Windows Media Player available on Microsoft Web Site.
Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click the following link to download and install the Microsoft Windows Media Player.
Microsoft WindowsMediaPlayer7.1 (WMP7.1) --- For Win2000
If this version is outdated - please download and install the most current version of Windows Media Player available on Microsoft Web Site.

Figure 3-151 Download/Installation Message Examples #2

3-8-9-1-1 Manually Setting the Network PC for eVue Import

1) On the network computer, create a New User by accessing the Control Panel, as follows:

   a.) Double-click on **My Computer** icon on desktop.

   b.) Double-click on **Control Panel** icon.

2) Double-click on **User Accounts** icon.

The User Accounts dialog box opens:

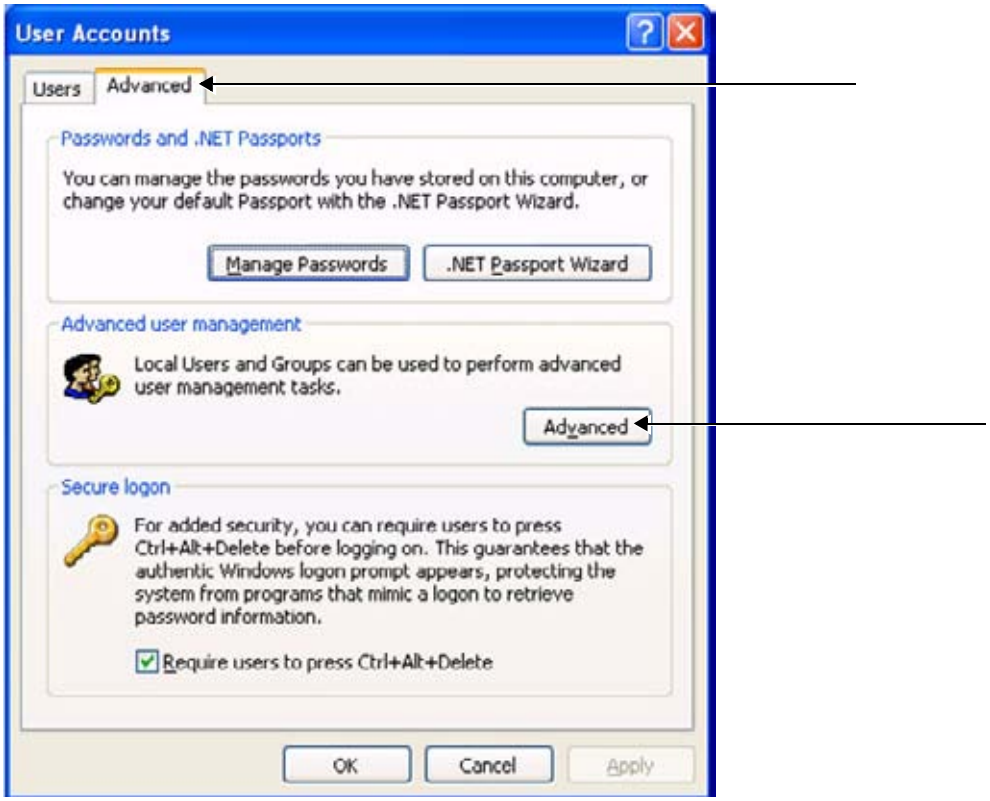

User Accounts
Users
Advanced
Passwords and .NET Passports
You can manage the passwords you have stored on this computer, or change your default Passport with the .NET Passport Wizard.
Manage Passwords
.NET Passport Wizard
Advanced user management
Local Users and Groups can be used to perform advanced user management tasks.
Advanced
Secure logon
For added security, you can require users to press Ctrl+Alt+Delete before logging on. This guarantees that the authentic Windows logon prompt appears, protecting the system from programs that mimic a logon to retrieve password information.
Require users to press Ctrl+Alt+Delete
OK
Cancel
Apply

Figure 3-152 User Accounts Dialog Box

3) Select the **Advanced Tab**.
4) Click on the **Advanced** button.

The Local Users and Groups dialog box opens:

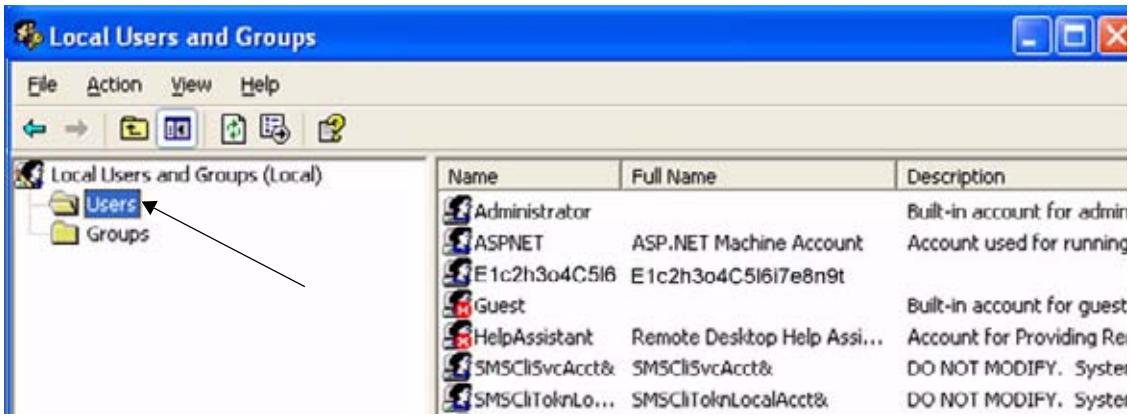


Figure 3-153 Local Users and Groups Dialog Box

5.) Select the **Users folder** and right-click to select **New User**.

The New User dialog box opens:

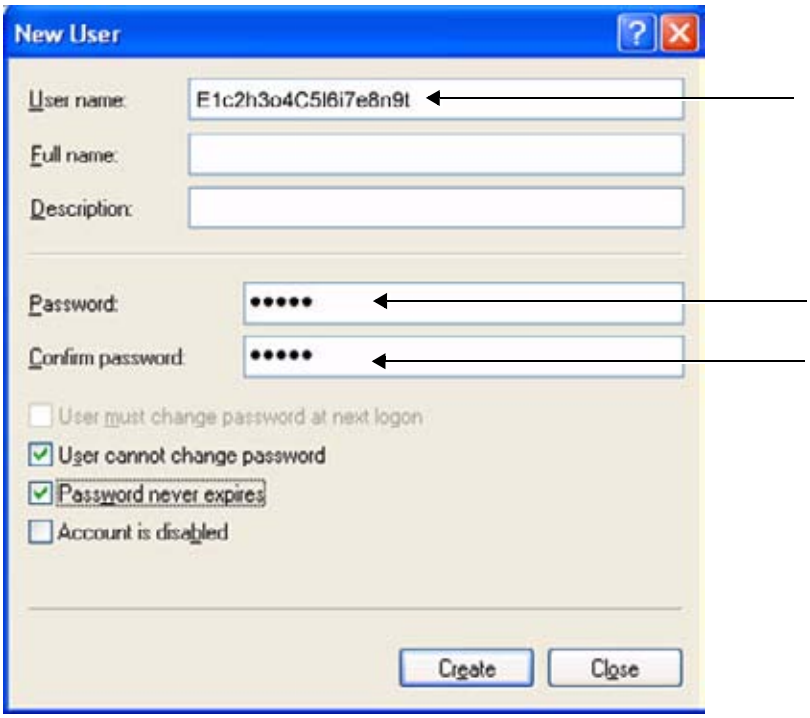


Figure 3-154 New User Dialog Box

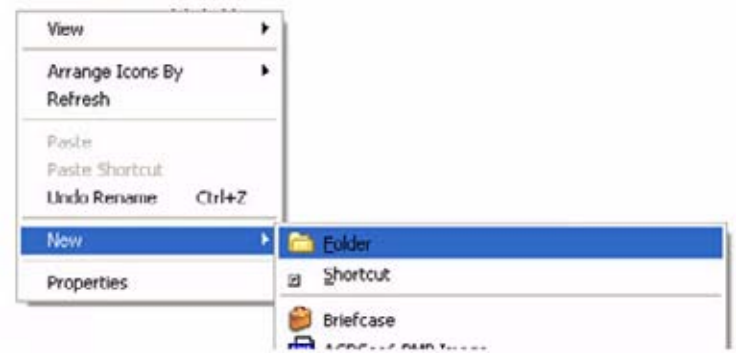
6.) Configure a new user account, as follows (see Figure 3-154):
   a.) User name: **E1c2h3o4C5l6i7e8n9t**
   b.) Password: **u1l3t5r7a**
   c.) Deactivate the *User must change password at next logon* check box.
   d.) Activate both the **User cannot change password** and **Password never expires** check boxes.
   e.) Click **Create** (to confirm setting), and **Close**.
   f.) Close all windows.

The new user account has been set and is ready for activation.

Create a new folder for import/export and set sharing permissions, by proceeding as follows:

7.) On the network computer, double-click on the **My Computer** icon on the desktop.
8.) Under My Computer window select **any local drive** for retrieval of data and create a folder for sharing, as follows:
   a.) Under the selected drive, place the cursor in an empty screen region and right-click the mouse.

b.) Now select **New** and **Folder**, to create a new folder:



Important: When more than one scanner is used to export with eVue, it is recommended to configure each scanner with its own folder for exporting files.

c.) Right-click on the New Folder icon and select **Rename**. Rename the folder as **eVue _Import**:

9.) Setting the Sharing properties for the new folder, as follows:

a.) Right-click on **eVue_Import** icon and select **Properties**;

The eVue_Import Properties dialog box opens, as shown in Figure 3-155 on page 3-149.

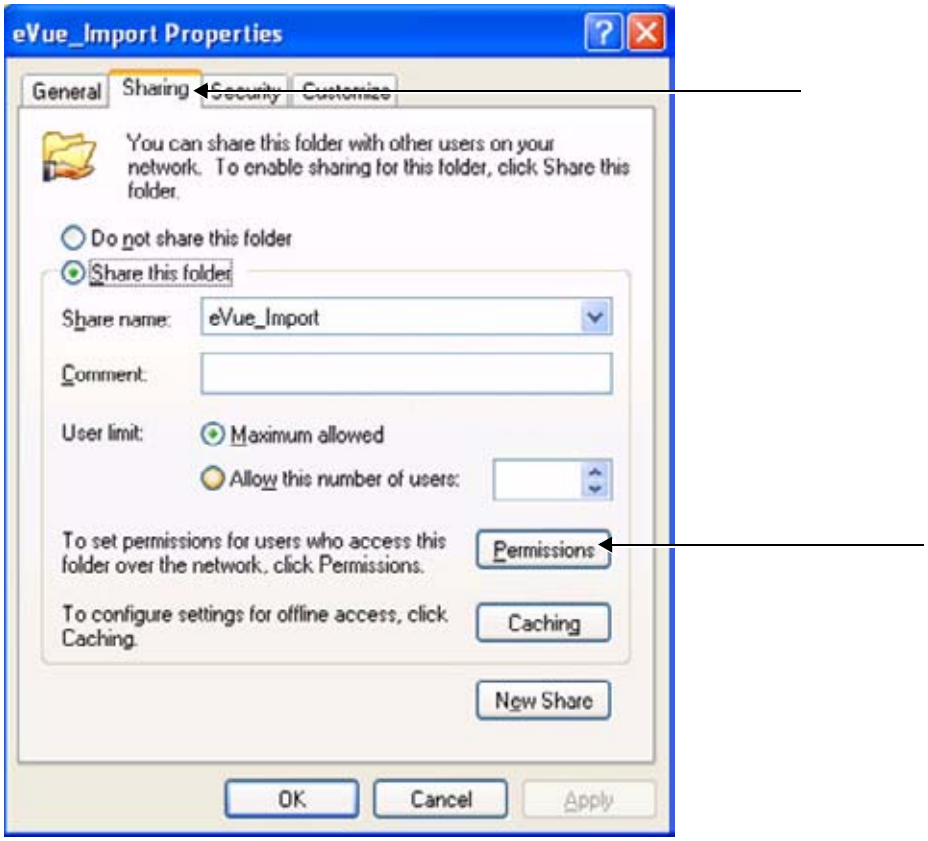
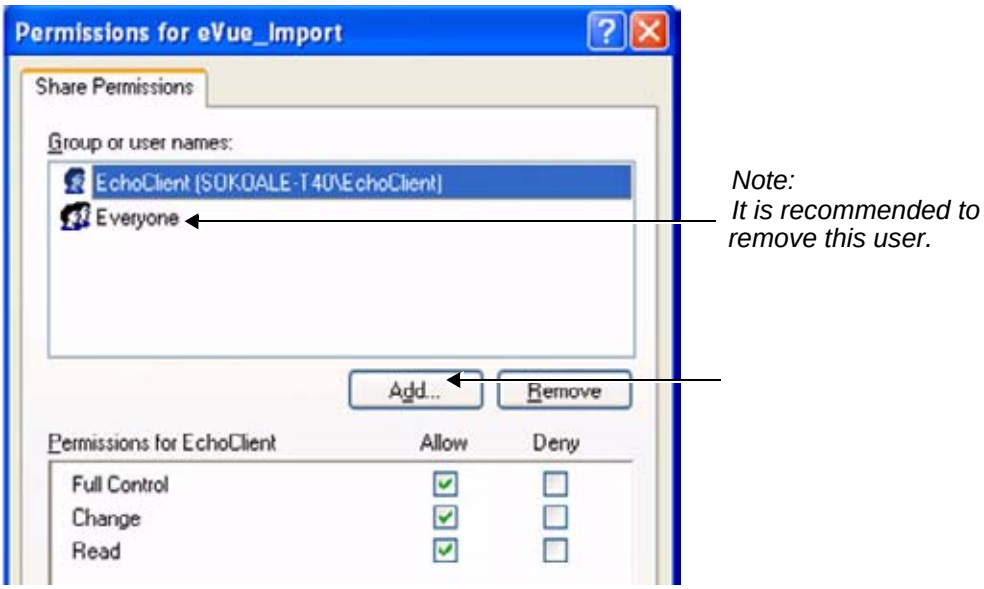


Figure 3-155 eVue_Import Properties Dialog Box

b.) Select the **Sharing Tab**.

c.) Click on the **Permissions** button.

The Permissions for eVue Import dialog box opens:



Note:
It is recommended to remove this user.

Figure 3-156 Permissions for eVue Import Dialog Box

d.) Click the **Add** button.

Note: It is recommended to remove the User **Everyone** from Share Permissions.

The Select Users, Computers, or Groups dialog box opens:

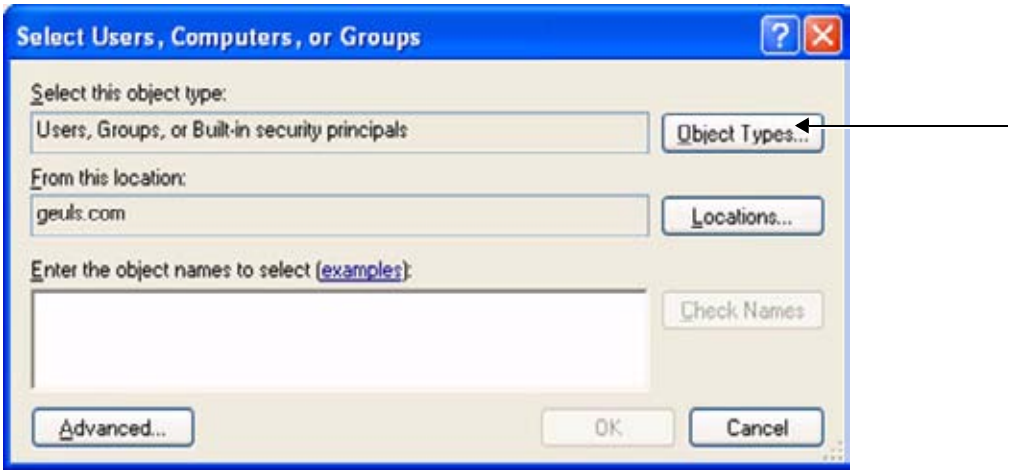
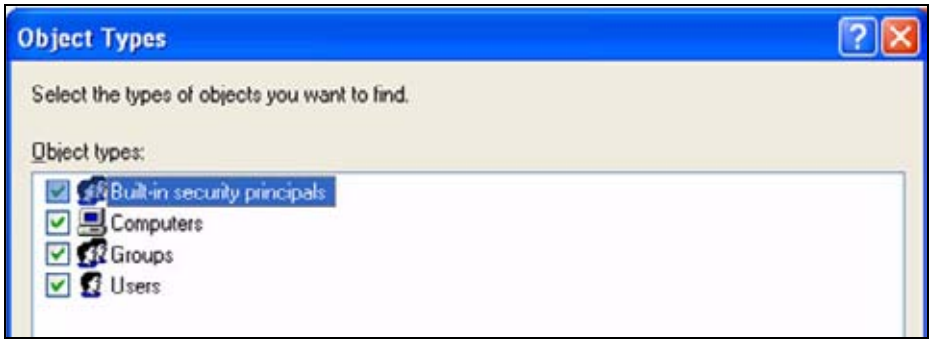


Figure 3-157 Select Users, Computers, or Groups Dialog Box

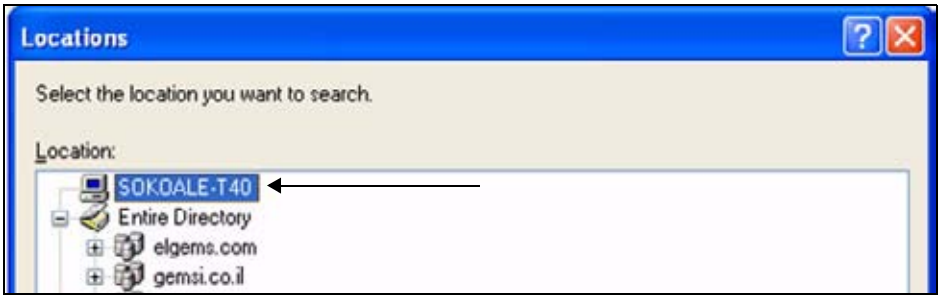
e.) Click the **Object Types** button.

f.) From the Object Types dialog box, select **all** to be active (activate all the check boxes, as shown below) and press **OK**.



g.) From the Select Users, Computers, or Groups dialog box (Figure 3-157), click on the **Locations** button.

h.) In the Locations dialog box, select your **computer** from the list and press **OK**.



i.) In the Select Users or Groups dialog box, type **E1c2h3o4C5l6i7e8n9t** in the empty window, as shown in Figure 3-158.

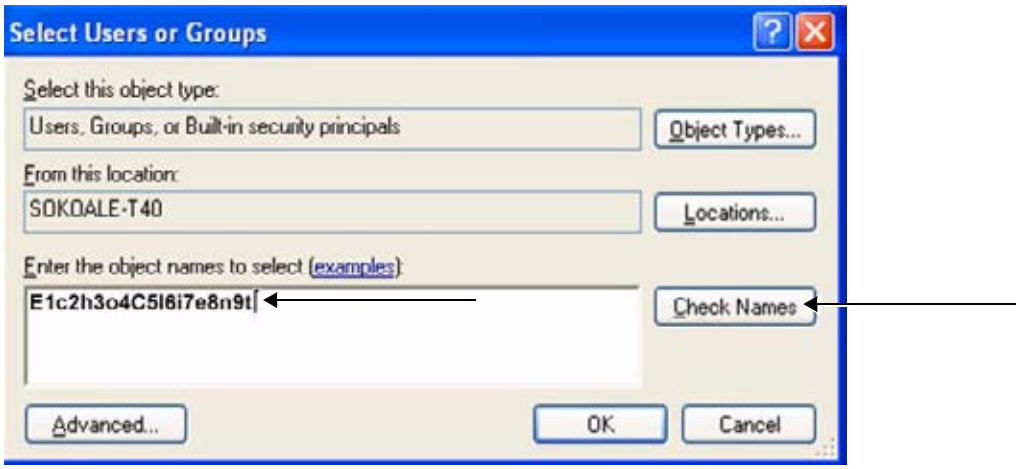
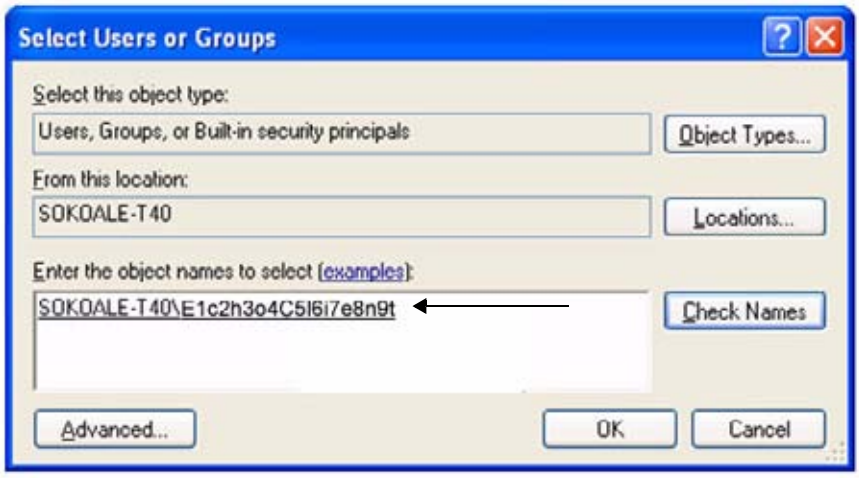


Figure 3-158 Select Users or Groups Dialog Box - Check Names

j.) Click the **Check Names** button.

The name and path will be detected by underlining, as shown below.



k.) Now click **OK**.

l.) From the Permission for eVue_Import dialog box, highlight and select **E1c2h3o4C5l6i7e8n9t** from the list (see Figure 3-159).

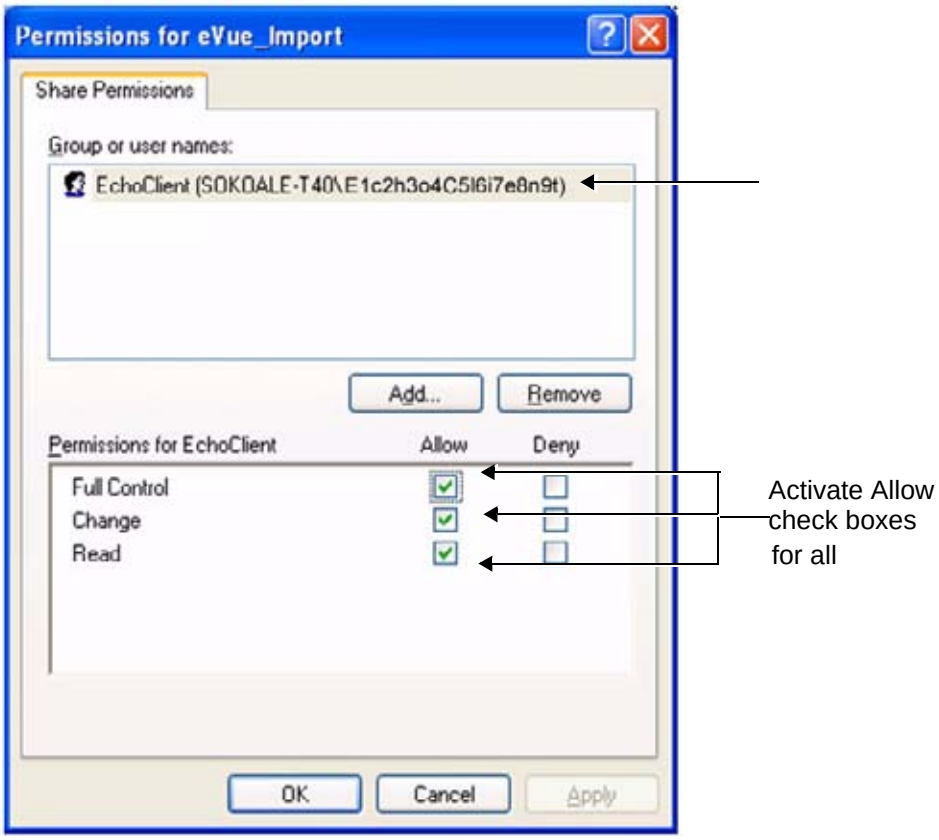


Figure 3-159 Setting Permissions for E1c2h3o4C5l6i7e8n9t

m.) Activate the *Allow* check boxes for all of the following: **Full Control**, **Change**, and **Read**.

n.) Click the **OK** button.

o.) **Close all** windows.

Note: The network computer is now ready to receive files from the Vivid-i™/ Vivid-q™ system. At this stage, set the appropriate path for export of files into the network computer. For example, for eVue, Data Flow or MpegVue export into the network computer using the browsing option to select the appropriate path. For an example of Vivid-i™/ Vivid-q™ dataflow settings, refer to Figure 3-147 on page 3-141.

3-8-9-1-2 Manually Stopping the Firewall on the Network PC

NOTE: In some cases, it is necessary to stop the firewall to allow functions such as Excel export and eVue to access and load files into the Network Computer. The Firewall can be an external service, or part of the Windows Basic Firewall tools.

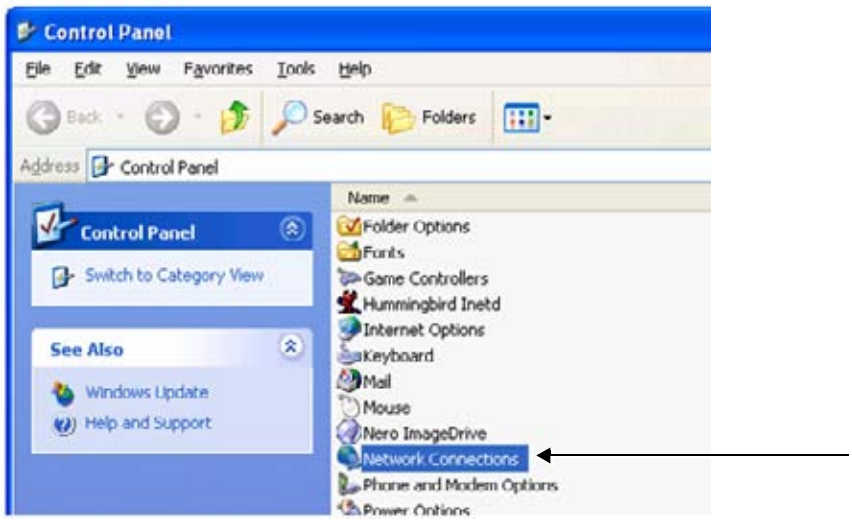
Stopping the Windows Firewall

1.) On the network computer, access the **Control Panel**, as follows:

a.) Press **Start**.

b.) Select **Settings**

c.) Select **Control Panel** from the Menu.



2.) Double-click on **Network Connections** as shown above.

3.) Select your network connection and right-click.

4.) From the drop-down menu, select **Properties**.

The Local Area Connection Properties dialog box opens:

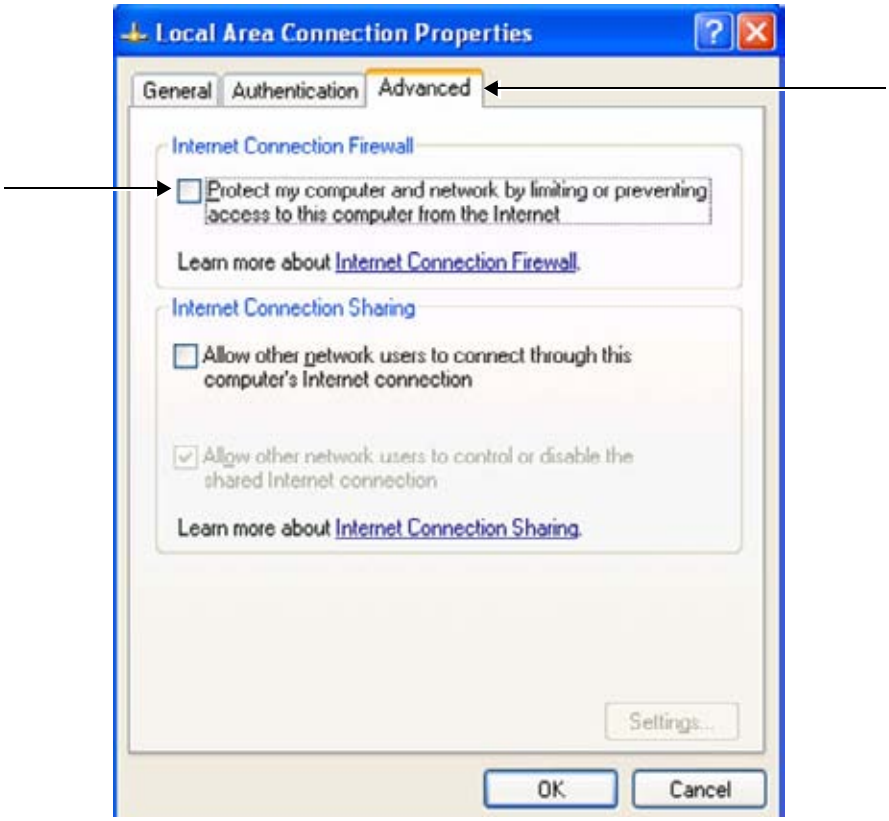

Local Area Connection Properties
General
Authentication
Advanced
Internet Connection Firewall
Protect my computer and network by limiting or preventing access to this computer from the Internet
Learn more about Internet Connection Firewall.
Internet Connection Sharing
Allow other network users to connect through this computer's Internet connection
Allow other network users to control or disable the shared Internet connection
Learn more about Internet Connection Sharing.
Settings...
OK
Cancel

Figure 3-160 Local Area Connection Properties Dialog Box

5.) Select the **Advanced** Tab.

6.) Uncheck the **Internet Connection Firewall** check box, as shown in Figure 3-160.

7.) Click the **OK** button to confirm changes and close all windows.

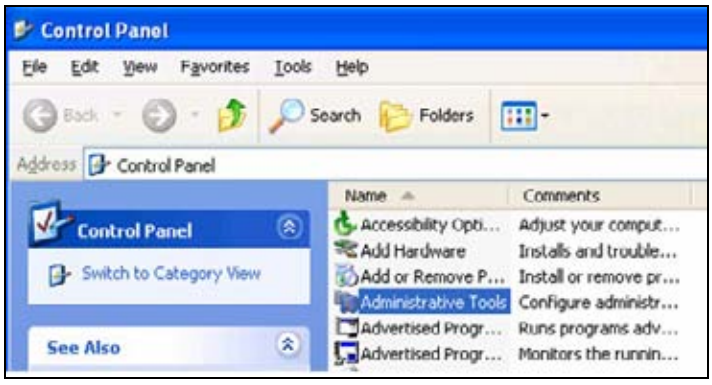
Stopping an External Service Firewall

1.) On the network computer, access the **Control Panel**, as follows:

a.) Press **Start**.

b.) Select **Settings**

c.) Select **Control Panel** from the Menu



2.) Double-click on **Administrative Tools.**

The Administrative Tools dialog box opens:

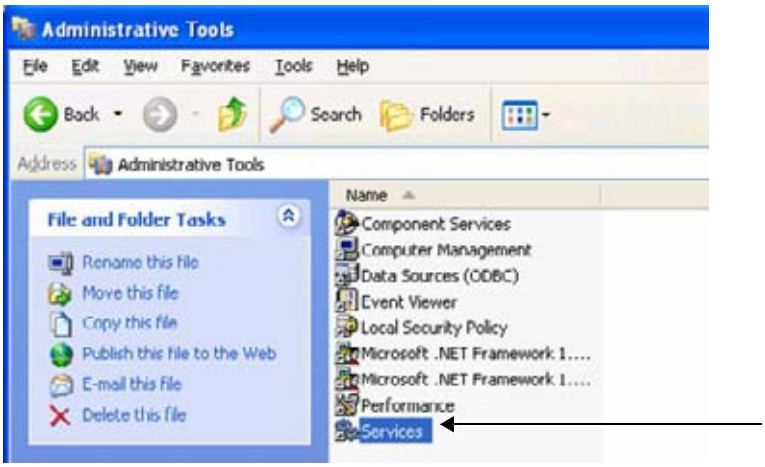


Figure 3-161 Administrative Tools Dialog Box

3.) Double-click on **Services**.

4.) From the Services dialog box, select your **firewall program** (for example, Black Ice).

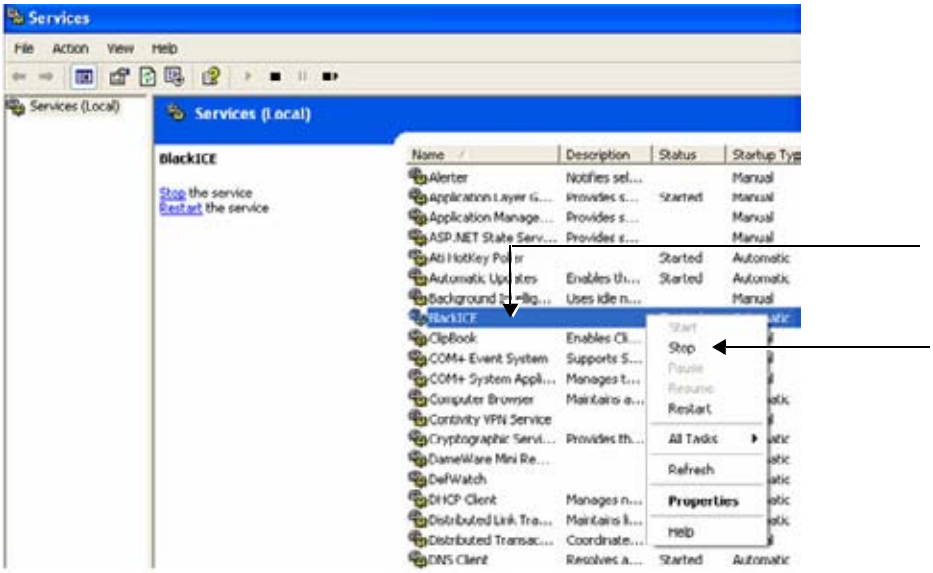
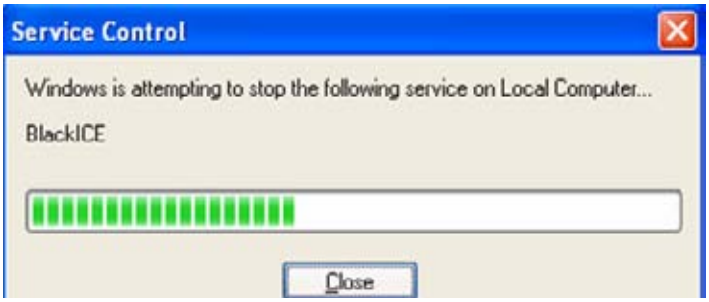


Figure 3-162 Services Dialog Box

5.) Right -click and select **Stop** from drop-down menu.

The following message will be displayed indicating that the Firewall is being stopped.



6.) When finished, click **Close**.

7.) Now you can try to reconnect the network computer to the Vivid-i™/ Vivid-q™ system.

Stopping the Firewall on Windows XP Service Pack 2

1.) On the network computer, access the **Control Panel**, as follows:

a.) Press **Start**.

b.) Select **Settings**

c.) Select **Control Panel** from the Menu

2.) Double-click on **Windows Firewall.**

The Windows Firewall dialog box opens:

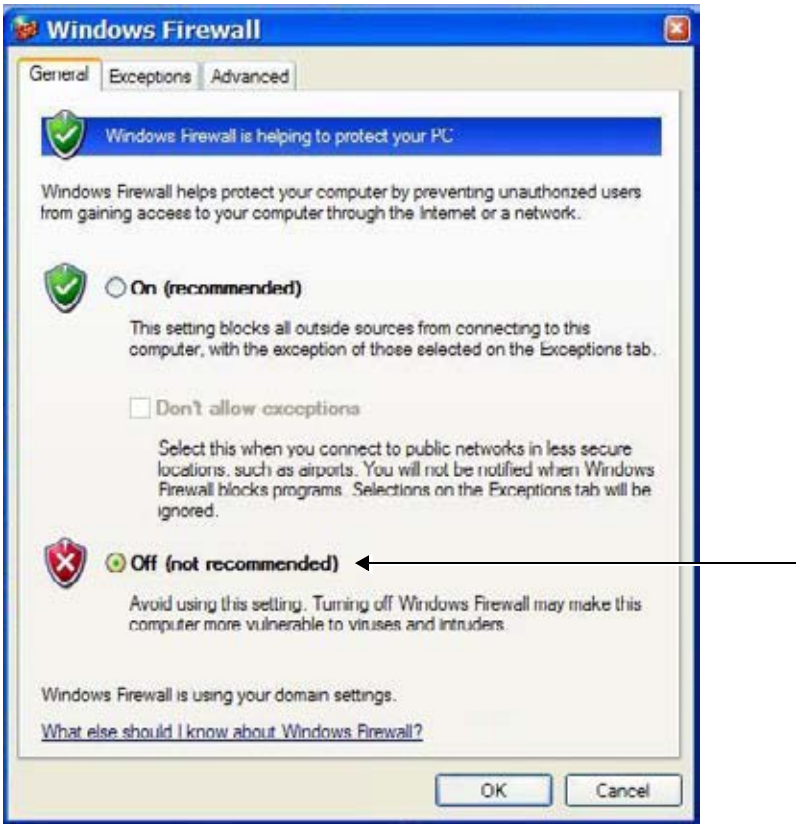

Windows Firewall
General
Exceptions
Advanced
Windows Firewall is helping to protect your PC
Windows Firewall helps protect your computer by preventing unauthorized users from gaining access to your computer through the Internet or a network.
On (recommended)
This setting blocks all outside sources from connecting to this computer, with the exception of those selected on the Exceptions tab.
Don't allow exceptions
Select this when you connect to public networks in less secure locations, such as airports. You will not be notified when Windows Firewall blocks programs. Selections on the Exceptions tab will be ignored.
Off (not recommended)
Avoid using this setting. Turning off Windows Firewall may make this computer more vulnerable to viruses and intruders.
Windows Firewall is using your domain settings.
What else should I know about Windows Firewall?
OK
Cancel

Figure 3-163 Windows Firewall Dialog Box

3.) Select the **General** Tab.

4.) Enable the **Off** check box (as shown in Figure 3-163).

5.) Press **OK**.

6.) Close all windows to return to the scanning screen.

3-8-9-2 Un-installing MPEGVue on a Remote PC

1.) Log in to Windows with **Administrator** permissions.

Note: You may need to obtain these from the local IT person.

2.) Close all Internet Explorer windows, if open.

3.) From the **C:\Program Files\GEULS\eStorePlayer\Version1_0** folder, double-click on the **UnRegisterAll.bat** icon, as shown in Figure 3-164 below.

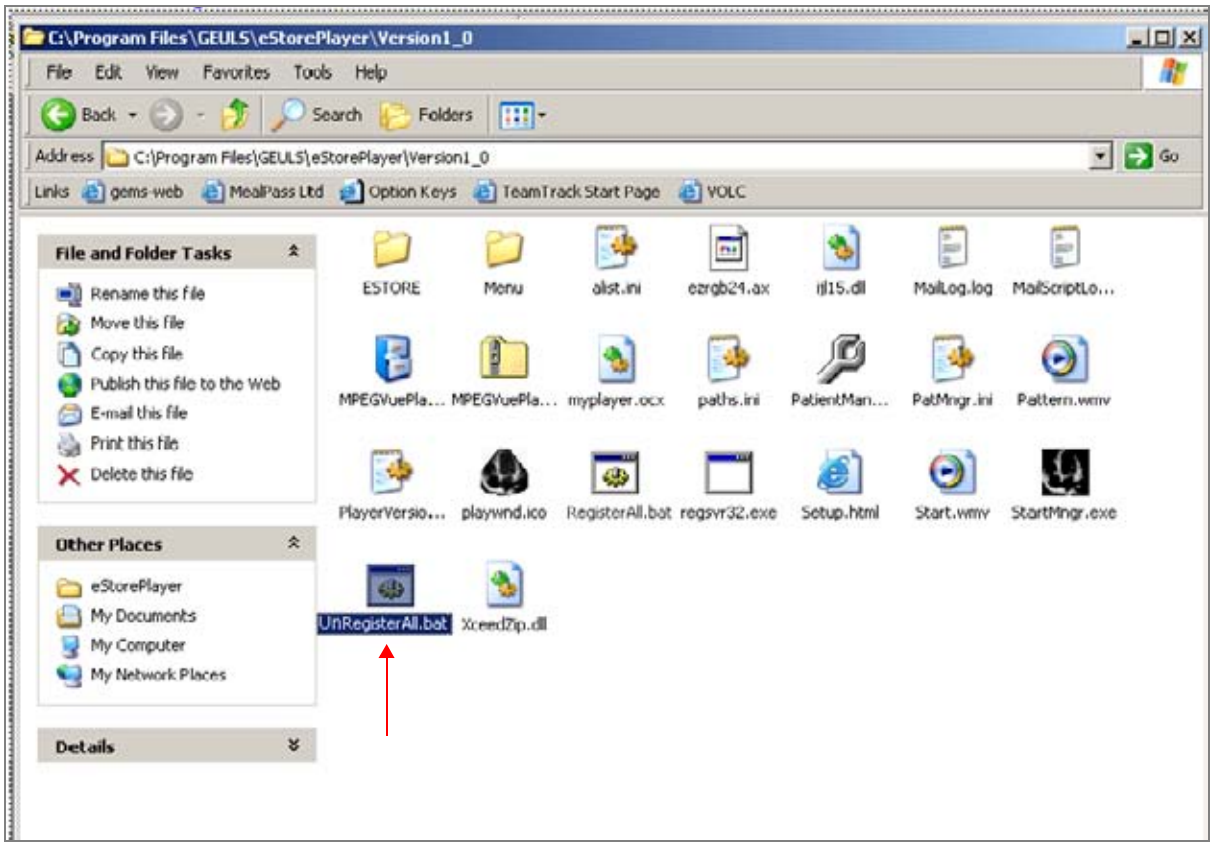


Figure 3-164 Uninstall MPEGvue - Stage 1

4.) If two messages are displayed one after another (shown in Figure 3-165 and Figure 3-166), click the **OK** button on each of them to close the message.

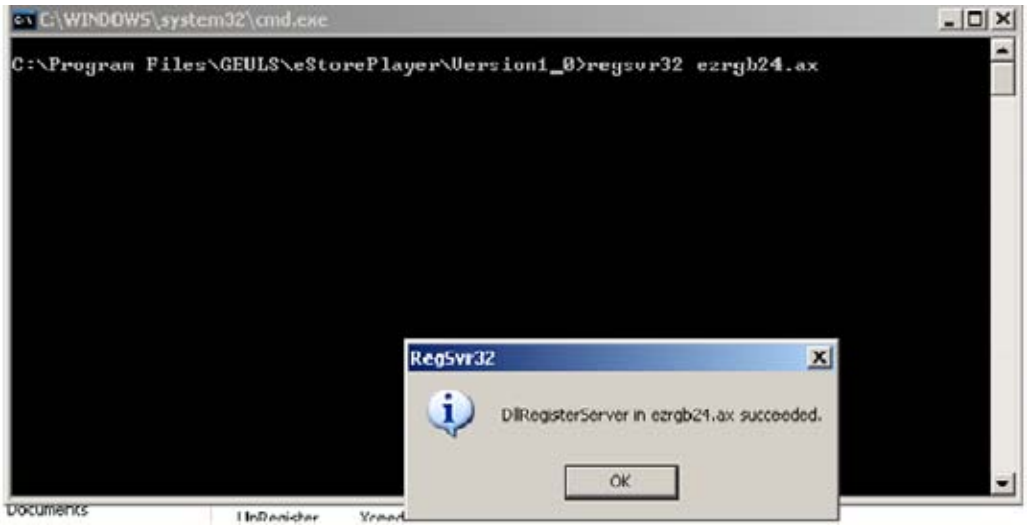


Figure 3-165 Uninstall Message 1

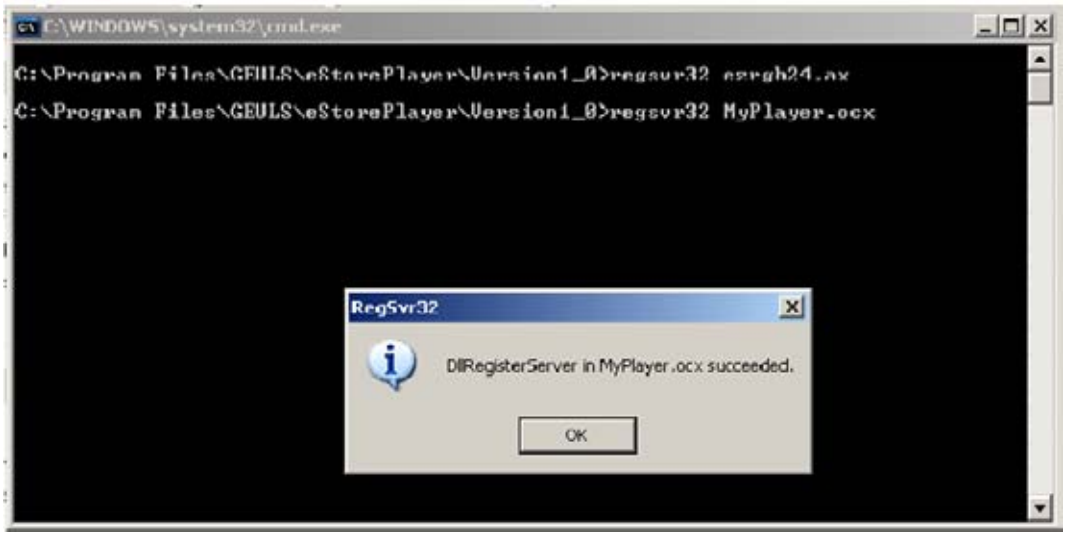


Figure 3-166 Uninstall Message 2

5.) From the **C:\Program Files\GEULS\eStorePlayer\Version1_0\ folder**, delete all files, as shown in Figure 3-167 on page 3-159.

6.)

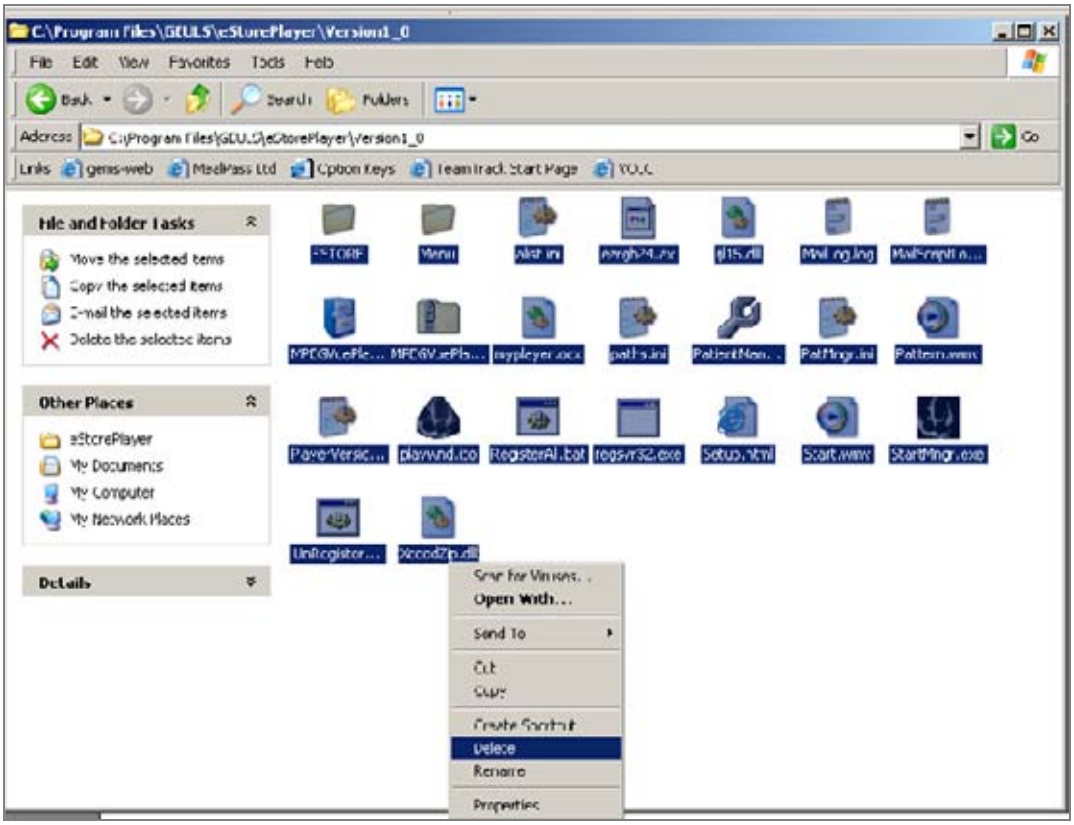


Figure 3-167 Deleting All Files

7.) Restart Windows, then confirm that the MPEGVue application is no longer installed.

3-8-9-3 Using MPEGVue Viewer on a Remote PC

3-8-9-3-1 Reading an MPEGVue Exam

An MPEG exam can be read on any computer with Windows 2000/XP/2003, provided that DirectX 8.1 (or later) and Windows Media Player 7.1 (or later) are installed.

NOTE: DirectX 9 and Windows Media Player 9 are recommended.

In addition, the following requirements should be met:

- CPU speed: 900 MHz or faster
- RAM Memory: 128 MB or higher
- Screen resolution: 1024 x 768 pixels (recommended)
- Colors: 24 bit or higher
- The PC should be configured for Auto-play.

To read an MPEGVue exam stored on a DVD/CD, proceed as follows:

- Insert the MPEGVue CD in the computer DVD/CD drive.

  The *MPEGVue Patient List* is displayed (see Figure 3-168 below).

Note: In the event that the MPEGvue DVD/CD is being run for the first time, the program will self-install the MPEGvue viewer. For more details, refer to Installing MPEGVue on a Remote PC on page 3 - 144.

To read MPEGVue exams stored on other media:

1) Insert the media (MOD or Memory stick) containing the MPEGVue exams into the MOD drive (or USB port) on the remote computer.
2) Double-click on the file **START_MPEGVue.bat**.

   The *MPEGVue Patient List* is displayed (see Figure 3-168 below).

3-8-9-3-2 MPEGVue Patient List

The MPEGvue player will always start by showing the Patient List contained in the inserted media (see the example below).

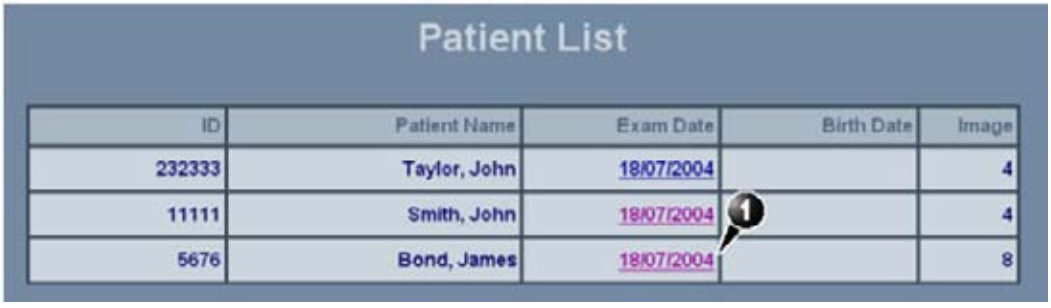
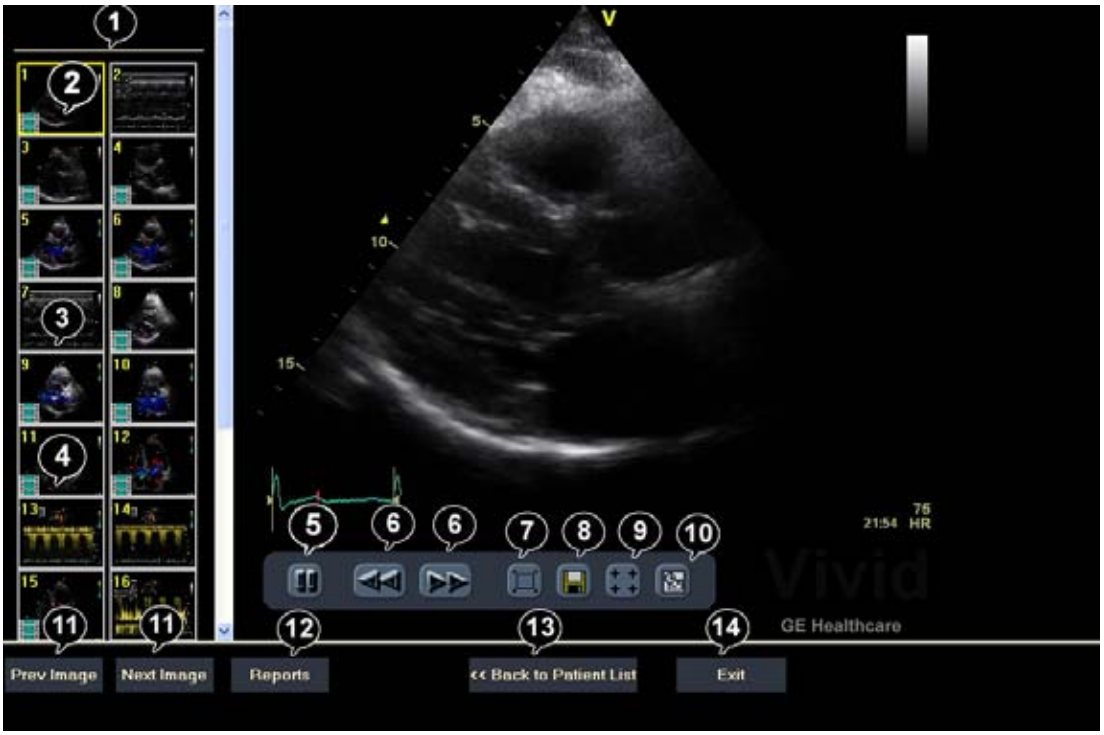


Figure 3-168 MPEGVue Patient List

1) Click on the required examination **Exam Date** (labelled 1 in the example above) to select and display images of that exam.

The *MPEGVue screen* is displayed as shown in the example in Figure 3-169 below.



1.	Clipboard: select the image to display	8.	Save image as MPEG or Bitmap file
2.	Selected image	9.	Measurement tool
3.	Single frame image	10.	E-mail support
4.	Cineloop	11.	Display previous/next image
5.	Freeze/run cineloop	12.	Display reports (button appears only when report is available)
6.	Scrolling tool when in Freeze	13.	Display the MPEGVue Patient List
7.	Full Screen (press any key to return to normal view)	14.	Quit MPEGVue Screen

Figure 3-169 MPEGVue Screen

2) Proceed to use the navigation tools described below to select an image and perform the various review functions, as required.

3-8-9-3-3 Selecting an Image

When a thumbnail image is selected for review, the thumbnail image in the clipboard area becomes bounded (highlighted) with a yellow frame. This currently-selected image is also displayed in full size in the MPEGVue Screen view pane.

There are several ways to select a thumbnail image from the clipboard:

- Use the mouse pointer. With the pointer on the required image, click the *left* mouse button to select the image.
- Use the **up** or **down** keyboard arrow to view the *next* or *previous* loop in the exam.
- Click on the **Next Image** or **Previous Image** buttons (#11 in Figure 3-169), as required.

3-8-9-3-4 Stopping & Running the Cine-Loop

When a loop is selected, it appears on the screen in *Run-Mode*.

There are several ways to stop a loop and view it frame-by-frame:

- Clicking on the **Freeze/Run** icon (#5 in Figure 3-169) will *freeze* the loop. Clicking on same icon once again will run the loop again.
- Clicking on the **scrolling** icons (#6 in Figure 3-169) will *stop* the loop, allowing the user to advance *forwards* or *backwards* to the required frame.
- Using the **left / right** arrows - when the loop is in *Run-Mode*, pressing either the **left** or **right** arrows on the PC keyboard will *freeze* the loop. Further pressing the left or right arrows will *advance* the loop frame-by-frame.

3-8-9-3-5 Selecting a Different Patient

Click on the **Back to Patient List** button (#13 in Figure 3-169). On the Patient List, click on the **Exam Date** of the required patient.

3-8-9-3-6 Exporting Images or Loops from MPEGvue

Using the “Save As…” function, an image may be saved to any of the following file formats:

- .BMP
- .WMV (MPEG4)
- .JPEG

To save an image, click on the diskette icon (#8 in Figure 3-169). A *Save As…* dialog-box will appear, allowing you to select the desired file format in which to save the image.

3-8-9-3-7 Performing Measurements on MPEGVue Images

The following measurements can be performed on MPEGVue images:

- Distance and area in 2D images
- Height, time, and slope in M-mode images
- Velocity and time in Doppler modes

In a 2D image:

1) Select the **Measurement** tool (#9 in Figure 3-169).

   The distance measurement tool is automatically selected.

2) Perform the distance measurement.

3) To perform an area measurement, right-click on the image and select **Area**. Perform the area measurement.

In Other Modes:

1) Select the **Measurement** tool (#9 in Figure 3-169).

2) Perform the measurement.

Note: If the original image contains measurements that were taken and stored on the Vivid-i™/ Vivid-q™ scanner, those measurements will appear in the MPEGvue image. In this case, additional measurements cannot be performed on that image.

Note: Currently, the measurement function is not available on DICOM images/loops, any secondary captured screens 3D images, or images with discontinuities.

3-8-9-3-8 Saved Worksheets

On the Vivid-i™/ Vivid-q™ scanner, it is possible to view the Worksheet and press **Store**. This will generate a still frame showing a snapshot of the Worksheet with the visible measurements on it. This same snapshot will also be visible in the MPEGvue Viewer.

This feature allows users to archive some important measurements into the MPEGvue file.

3-8-9-3-9 Reports (.CHM files)

When Reports have been generated and saved on the Vivid-i™/ Vivid-q™ scanner, they will be exported, along with the rest of the MPEGvue exam to the remote PC where they can be reviewed as CHM files.

When an exam contains Reports, an additional button is displayed on the bottom of the MPEGvue Screen enabling the user to view the Reports of that exam.

3-8-9-3-10 Using MPEGVue over E-mail

Note: To use the MPEGVue over E-mail feature, Microsoft Outlook must be currently running. If not, the following message is displayed prompting the user to first logon to Outlook:

It is possible to send images, loops, or full exams from any eVue PC. An eVue PC is a PC which contains the MPEGvue player and an e-mail client application (e.g. Microsoft Outlook).

The currently-selected image, or the entire examination, can be sent by e-mail as an attachment to one or several regular e-mail messages. Refer to Sending a Full Examination by E-mail below, or Sending an image by E-mail on page 3 - 165, as applicable.
The recipient PC of those e-mail messages (where the eVue viewer is installed), will receive the exams and will integrate them into its Patient List, for easy review.

Sending a Full Examination by E-mail

Note: If this is the *first* time your recipient is receiving MPEGVue images, it is necessary to attach the MPEGVue Player - refer to the instructions for Sending the MPEGVue Player Software by E-mail on page 3 - 167.

1) From the MPEGVue Screen, open the examination to be sent and click the **E-mail** button (#10 in Figure 3-169 on page 3-161).

   The *E-mail Dialog* box is displayed (see Figure 3-170 on page 3-164).

2) Activate the **Send Current Exam** radio button (and if necessary, the **Attach Player Software** check box), as shown in Figure 3-170 below.

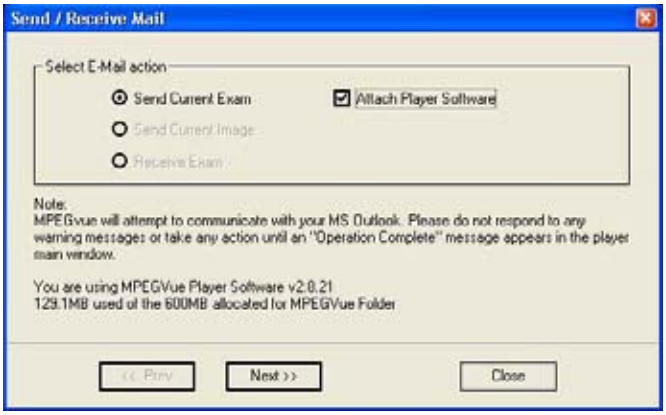

Send / Receive Mail
Select E-Mail action
Send Current Exam
Attach Player Software
Send Current Image
Receive Exam
Note:
MPEGVue will attempt to communicate with your MS Outlook. Please do not respond to any warning messages or take any action until an "Operation Complete" message appears in the player main window.
You are using MPEGVue Player Software v2.0.21
129.1MB used of the 600MB allocated for MPEGVue Folder
<< Prev
Next >>
Close

Figure 3-170 E-mail Dialog Box - Sending Current Exam

3.) Click **Next**.

The *E-mail address window* is displayed (Figure 3-171 below).

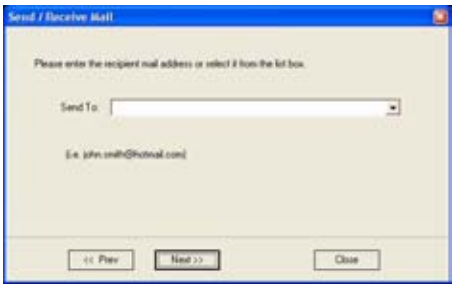


Figure 3-171 E-mail Address Window

4) Select an existing recipient address from the drop-down menu, or type a new address in the **Send To** field.

Note: Up to 10 addresses can be stored for future selection.

5) Click **Next**.

The user is prompted to enter a password (for encryption of the study) in the window displayed:

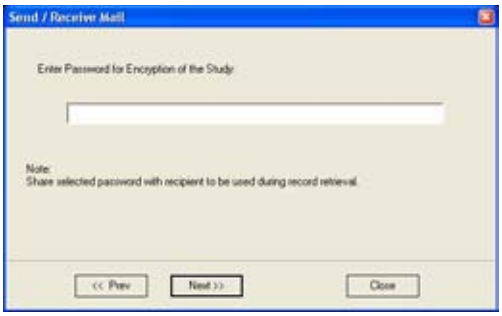

Send / Receive Mail
Enter Password for Encryption of the Study
Note:
Share selected password with recipient to be used during record retrieval.
<< Prev
Next >>
Close

Figure 3-172 Enter Password Window

6) Type a unique password for the study.

Note: ***The password should be given to the recipient of the e-mail verbally by phone or by other protected means.***
(It is recommended to keep a separate record of passwords used).

7) Click **Next**.

The E-mail (addressed to the selected addressee) with the full examination attached is sent to the Outbox; during this operation a series of progress windows are displayed, as seen in this example:

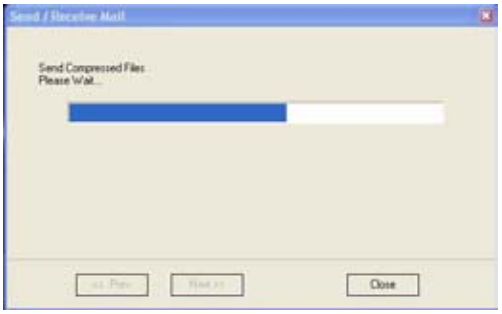


Figure 3-173 Sending Message to Outbox Progress Window

When the operation is complete, a *Confirmation window* is displayed as shown below.

Operation Completed
Send operation completed successfully!
Please ensure delivery of Emails placed in the Outbox of your Outlook.
OK

Figure 3-174 Operation Completed Message

8) Click **OK** to close the message window.

9) Check that the e-mail message has been sent from the Outlook Outbox.

Notes: Examinations sent by E-mail as attachments are compressed, encrypted, and password-protected. If the size of the exam is too large to be sent as a single attachment, it is divided into several zip file attachments sent with several independent E-mails, each less than 1Mbyte in size.

The extension of the attached files is **.mpegvue** and can only be opened with the MPEGvue viewer.

Sending an image by E-mail

Note: If this is the *first* time your recipient is receiving an MPEGVue image, it is necessary to attach the MPEGVue Player - refer to the instructions for Sending the MPEGVue Player Software by E-mail on page 3 - 167.

1) From the clipboard, select the image to be sent and click the **E-mail** button (#10 in Figure 3-169 on page 3-161).

The *E-mail Dialog* box is displayed.

Send / Receive Mail
Select E-Mail action
Send Current Exam
Send Player Software
Send Current Image
Receive Exam
Note:
MPEGvue will attempt to communicate with your MS Outlook. Please do not respond to any warning messages or take any action until an "Operation Complete" message appears in the player main window.
You are using MPEGVue Player Software v2.8.21
129.1MB used of the 600MB allocated for MPEGVue Folder
<< Prev
Next >>
Close

Figure 3-175 E-mail Dialog Box

2) Activate the **Send Current Image** radio button, then click **Next**.

Note: If it is necessary to send the MPEGVue Player software to the recipient, first complete this procedure, then proceed to Sending the MPEGVue Player Software by E-mail on page 3 - 167.

The *E-mail address window* is displayed.

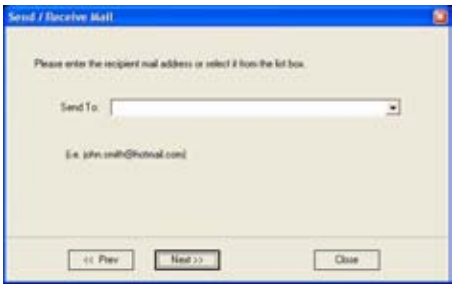


Figure 3-176 E-mail Address Window

3) Select an existing recipient address from the drop-down menu, or type a new address in the **Send To** field.

Note: Up to 10 addresses can be stored for future selection.

4) Click **Next**.

The E-mail (addressed to the selected addressee) with the image is sent to the Outbox; during this operation a progress window is displayed:

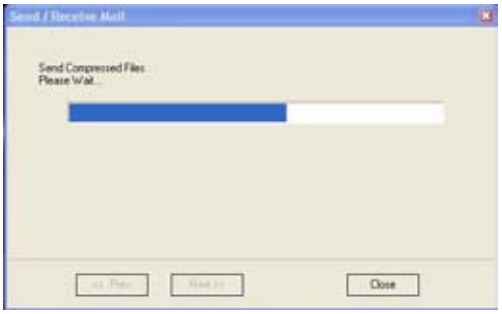


Figure 3-177 Sending Message to Outbox Progress Window

When the operation is complete, a *Confirmation window* is displayed as shown below..

Operation Completed
Send operation completed successfully!
Please ensure delivery of Emails placed in the Outbox of your Outlook.
OK

Figure 3-178 Operation Completed Message

5) Click **OK** to close the message window.

6) Check that the message has been sent from the Outlook Outbox.

When the message has been sent from the Outbox and received by the E-mail recipient, the image can now be opened in Windows Media Player.

Sending the MPEGVue Player Software by E-mail

Note: This procedure is required *once* - only the *first* time your recipient is receiving MPEGVue image/s.

1) From the *E-mail Dialog* box, activate the Send Player Software check box:

Send / Receive Mail
Select E-Mail action
Send Current Exam
Send Player Software
Send Current Image
Receive Exam
Note:
MPEGvue will attempt to communicate with your MS Outlook. Please do not respond to any warning messages or take any action until an "Operation Complete" message appears in the player main window.
You are using MPEGVue Player Software v2.0.21
129.1MB used of the 600MB allocated for MPEGVue Folder
<< Prev
Next >>
Close

Figure 3-179 E-mail Dialog Box - Sending Player Software

2) Click **Next**.

3.) From the Email Address Window (Figure 3-176 on page 3-166), select the appropriate recipient address from the drop-down menu, or type the address in the **Send To** field.

4) Click **Next**.

The E-mail (addressed to the selected addressee) with the MPEGVue Player software is sent to the Outbox; during this operation a progress window is displayed (Figure 3-173).

When the operation is complete, a Confirmation window is displayed as shown in Figure 3-174.

5) Click **OK** to close the message window.

6) Check that the message has been sent from the Outlook Outbox.

Note: When the message has been sent from the Outbox and has arrived at the addressee, the recipient should follow the instructions (included in the body of the email) in order to install the MPEGVue Player.

First Time Receipt of MPEGVue Player Software and Images by E-mail

When a group of messages arrive by e-mail and the user wishes to review the exam by MPEGvue, proceed as follows:

1) From Outlook, open the received email message containing the *installation of MPEGVue Player* files (three attachments: MPEGVuePlayer.cab; Start.wmv; Setup.html). Right-click on each attachment and select *Save As* to save them to the **Desktop**.

Note: Do not double-click on an attachment.

2) From the desktop, double-click on the

icon.

The *following message* is displayed:

3) When prompted by the Warning message shown below, make sure all Internet Explorer windows are closed except the current window, then click **Yes** to proceed.

Warning
An important update for MPEGVue Player Software Component (v2.0.21) is available for this computer.
Before starting the update of your computer, please CLOSE ALL Windows of Microsoft Internet Explorer Except current.
Have you CLOSED ALL Windows of Microsoft Internet Explorer and are you ready to continue ?
Yes
No

Figure 3-180 Warning Message

When the installation of the MPEGVuePlayer software is complete, the MPEGVue Player Screen is displayed as shown in Figure 3-182 on page 3-170.

Note: At this point, the MPEGVue startup icon is now displayed on the desktop, ready for future use. The user may choose to view the images immediately or later (as preferred). Follow the instructions described in Get new exams by E-mail on page 3 - 170.

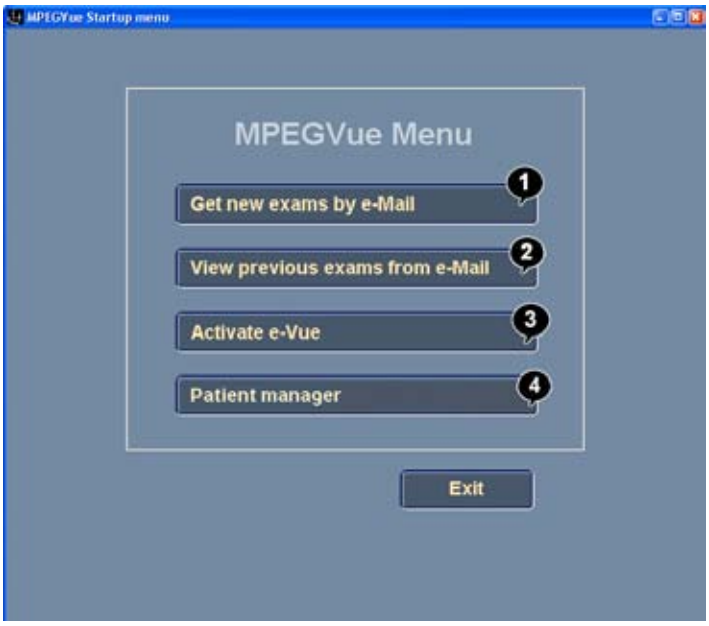
3-8-9-3-11 Managing and Viewing Exams Received

Once the MPEGVue Player software has been installed on a remote computer (as described in First Time Receipt of MPEGVue Player Software and Images by E-mail on page 3 - 168), the user is able to manage and review images or exams received via email, using the MPEGVue utilities described below.

1) From the desktop, double-click on the MPEGVue Startup

icon.

The MPEGVue Startup Menu opens:



1.	Provides access to Outlook Inbox
2.	Opens Patient List (lists only studies received by email)[a]
3.	Activates e-Vue - opens Patient List of studies received via export operation[a]
4.	Enables user to manage patient exams received by email, export or removable media (using copy, move or delete, as applicable)

a. button is disabled until images or exams have been received

Figure 3-181 MPEGVue Startup Menu

2) Proceed to use the required utility, as described in the procedures below.

3-8-9-3-12 Get new exams by E-mail

1) From the MPEGVue Startup Menu, click on the **Get new exams by email** button.

   The Start MPEGVue screen is displayed, as shown in Figure 3-182 below.

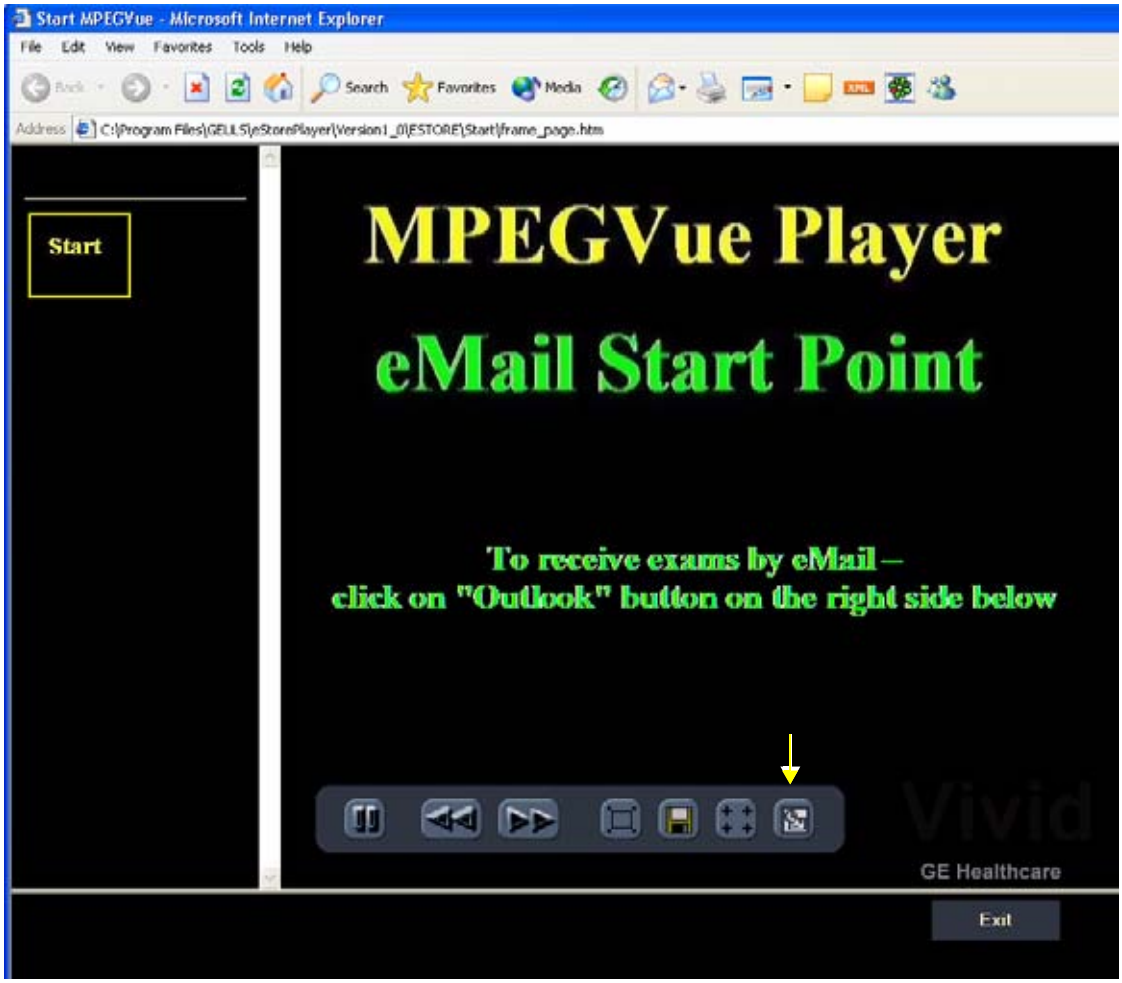


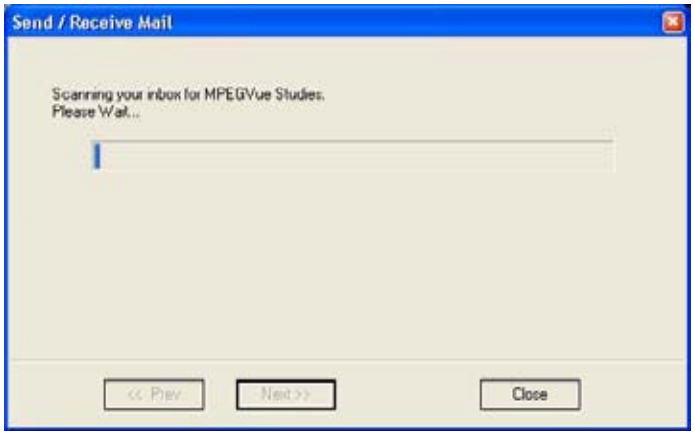
Figure 3-182 Start MPEGVue Screen

2) Click the Outlook **E-mail** button (shown in Figure 3-182).

   The E-mail dialog box is displayed - refer to Figure 3-175 on page 3-166.

3.) Activate the **Receive Exam** radio button, then click **Next**.

The following message is displayed while the e-mail Inbox is being scanned for studies:



When complete, all studies found in the Inbox are listed in the Found Studies dialog box, as shown in Figure 3-183 below.

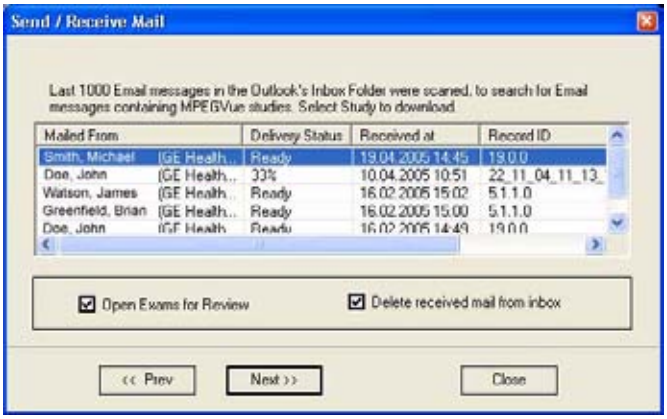

Send / Receive Mail
Last 1000 Email messages in the Outlook's Inbox Folder were scanned, to search for Email messages containing MPEGVue studies. Select Study to download.
Mailed From
Delivery Status
Received at
Record ID
Smith, Michael (GE Health... Ready 19.04.2005 14:45 19.0.0
Doe, John (GE Health... 33% 10.04.2005 10:51 22_11_04_11_13_
Watson, James (GE Health... Ready 16.02.2005 15:02 5.1.1.0
Greenfield, Brian (GE Health... Ready 16.02.2005 15:00 5.1.1.0
Doe, John (GE Health... Ready 16.02.2005 14:49 19.0.0
Open Exams for Review
Delete received mail from inbox
<< Prev
Next >>
Close

Figure 3-183 List of Studies Found in Inbox

4) Select the required Study from the list.

Note: By default, the **Open Exams for Review** and **Delete Received Mail from Inbox** check boxes are activated.

5.) Click **Next**.

The *Password window* is displayed:.

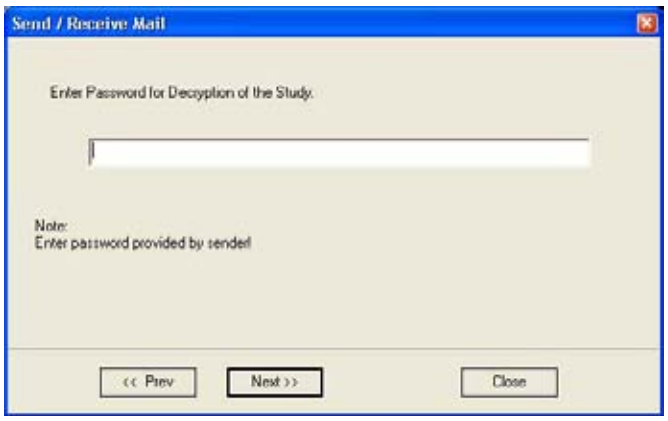


Figure 3-184 Password Window

6) Enter the same password (for decryption of the study) as that used by the sender of the e-mails.

Note: The Password is case-sensitive. In the event that an incorrect password is typed, the user is prompted with a warning message, as shown here. Click **OK** and enter the correct password.

7) Click **Next**.

The message *Receiving Selected Messages* is displayed, followed by another message (see Figure 3-185 below) showing progress of deletion of messages from the Inbox.

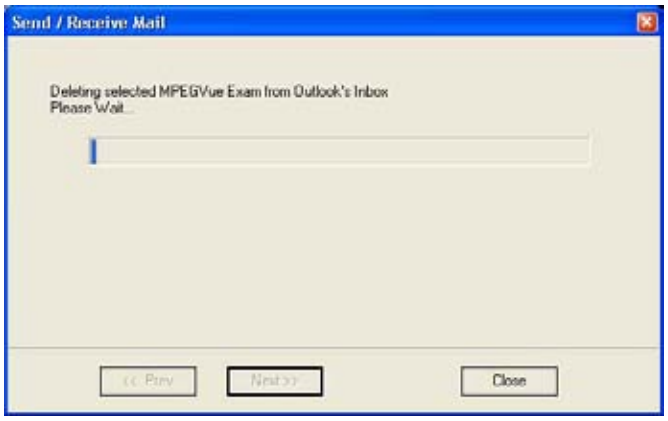


Figure 3-185 Message Showing Exams being Deleted from Inbox

The E-mail message(s) containing the MPEG examination is deleted from “In-box” of Outlook and is moved to the “Deleted-items” box of Outlook. When done, the following message is displayed:

8) Click **OK** to close the message.

The exam is now listed in the MPEGVue Patient List (see Figure 3-186 below) and is ready for selection and viewing.

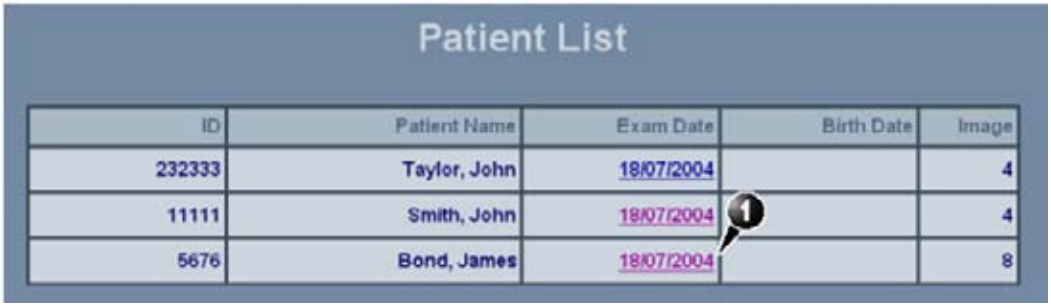


Figure 3-186 MPEGVue Patient List

Note: When viewing the examination which has been received from e-mail, a separate instance of MPEGvue application is opened, dedicated only for one e-mail examination. If you were previously viewing different MPEGvue Patient exams, you will need to switch over to the previous instance of the MPEGvue.

Receiving and Viewing a Partial Examination

In the event that the exam is large and a group of e-mails is expected, it is possible to view a partial exam, even before all of the e-mail messages have arrived.

In addition, if an e-mail message is lost or corrupted, the contents of the remainder of the received messages is available for review.

After receiving even one e-mail message out of many that have yet to arrive, simply select the new examination in the MPEGVue Screen. The screen display will show voids or missing thumbnail images in all places relating to the e-mail messages that have not yet arrived.

View previous exams from E-mail

1) From the MPEGVue Startup Menu, click on the **View previous exams from email** button.

   The Patient List is displayed, listing all exams received by email:

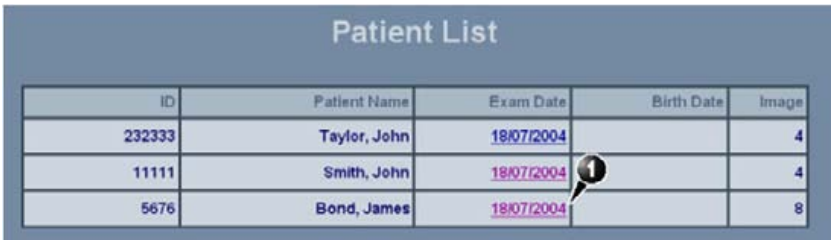


Figure 3-187 MPEGVue Patient List

2) Click on the required examination **Exam Date** (labelled 1 in the example above) to select and display images of that exam.

   The *MPEGVue screen* is displayed as shown in the example in Figure 3-169 on page 3-161.

Activate e-Vue

1) From the MPEGVue Startup Menu, click on the **Activate e-Vue** button.

   The Patient List is displayed, listing all e-Vue exams received (refer to Figure 3-187, above).

2) Click on the required examination **Exam Date** (labelled 1 in the example above) to select and display images of that exam.

   The *MPEGVue screen* is displayed as shown in the example in Figure 3-169 on page 3-161.

Using Patient Manager

1) From the MPEGVue Startup Menu, click the Patient manager button.

The MPEGVue Patient Manager window opens, as shown below:

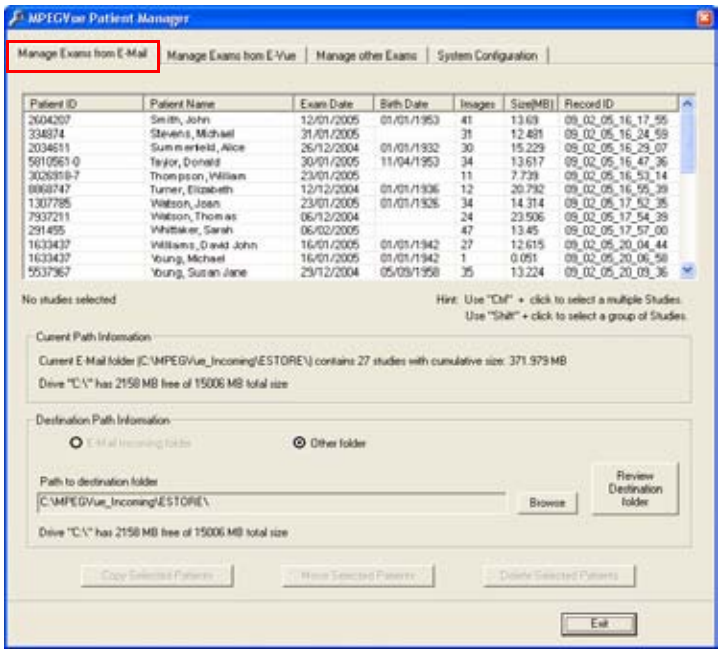


Figure 3-188 MPEGVue Patient Manager Window - Manage Exams from Email Tab

The MPEGVue Patient Manager window has four tabs that provide access to the following utilities:

- Manage Exams from Email
- Manage Exams from e-Vue
- Manage Other Exams
- System Configuration

Note: By default, when the MPEGVue Patient Manager window is first opened, the Manage Exams from Email tab is activated.

2.) **Manage Exams from Email**, as follows:

a.) Make sure the Manage Exams from Email tab is activated as shown in Figure 3-188.

The Patient List displays details - in table format - of all patient exams received by email (*Patient ID*, *Patient Name*, *Exam Date*, *etc*.).

The current path information is displayed below the Patient List as well as number of studies, cumulative size and amount of space available on the drive. By default, the destination path *Other Folder* radio button is enabled.

b.) Select the required exam or exams, as shown in Figure 3-189.

(Use Ctrl +click to select more than one study; Shift + click to select a group of studies)

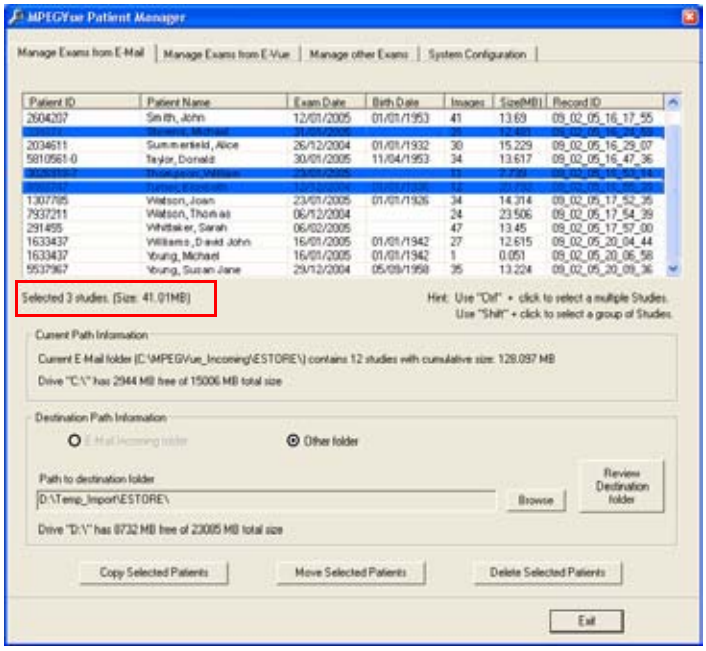


Figure 3-189 Exams Selected

The currently-selected exams are now highlighted in the list and, as shown in Figure 3-189, the cumulative size of the 3 studies is displayed below.

The three study management buttons are now as follows:

Delete Selected Patients - enabled

Copy Selected Patients and *Move Selected Patients* - remain disabled until at least one Study has been selected and the Destination Path has been specified (providing the destination is NOT read-only media [such as, CD/DVD-ROM]). Only when *both* these tasks have been performed will these two buttons become enabled.

c.) To **copy** or **move** the selected exams, first click the Browse button and select the required destination folder, then click the **Copy Selected Patients** *or* **Move Selected Patients** button as appropriate.

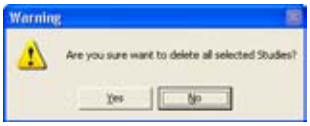
(If necessary, click the Review Destination folder button to review the destination folder Patient List).

During the copy or move operation, the relevant message and progress bar is displayed:

Note: When the selected studies have been *copied* to the destination folder, they will remain listed in the MPEGVue Patient Manager Patient List. However, if they have been *moved*, they will no longer be listed.

d.) To **delete** the selected exams, click the **Delete Selected Patients** button.

The user is prompted with the following warning message.



Click **Yes** to confirm the delete command.

Note: When the selected studies have been *deleted*, they will no longer be listed in the MPEGVue Patient Manager Patient List.

3.) **Manage Exams from E-vue**, as follows:

a.) Make sure the Manage Exams from Evue tab is activated as shown in Figure 3-190.

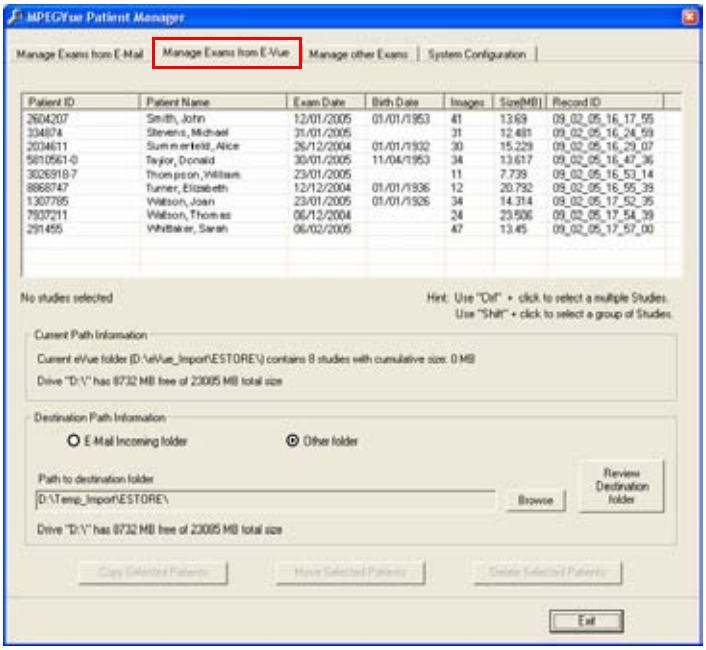


Figure 3-190 MPEGVue Patient Manager Window - Manage Exams from E-VueTab

The Patient List displays details - in table format - of all patient exams received via export from E-Vue (*Patient ID*, *Patient Name*, *Exam Date*, *etc.*).

The current path information is displayed below the Patient List as well as number of studies, cumulative size and amount of space available on the drive. By default, the destination path *Other Folder* radio button is enabled.

b.) Select the required exam or exams - refer to step b on page 3-175.

c.) **Copy** or **move** the selected exam/s, as required - refer to step c on page 3-176.

d.) If required, **delete** the selected exam/s - refer to step d on page 3-176.

4.) **Manage Other Exams**, as follows:

a.) Make sure the Manage Other Exams tab is activated as shown in Figure 3-191.

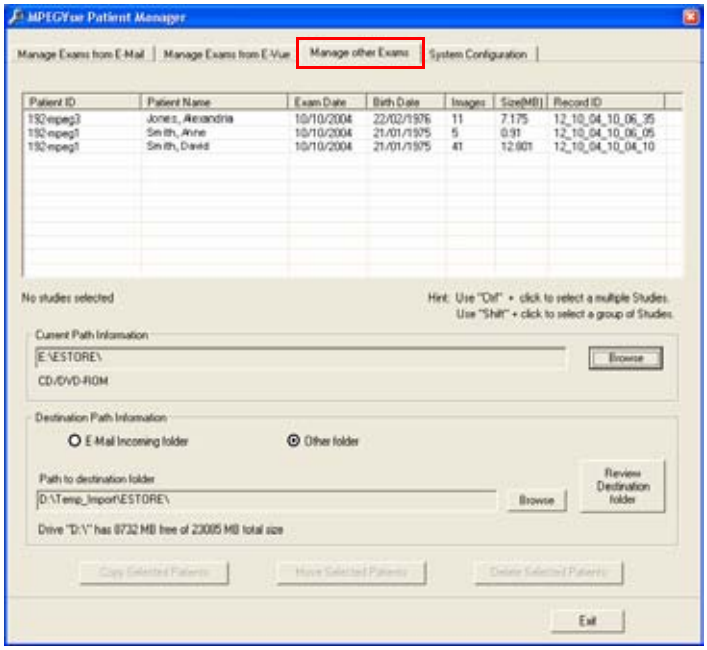


Figure 3-191 MPEGVue Patient Manager Window - Manage Other Exams Tab

Note: When the Manage Other Exams tab is first activated, the MPEGVue Patient Manager Window opens (by default) with the most recently-selected source directory active (even if the user selected this directory during *Copy*, *Move*, or *Delete* operations performed under another tab). At this stage, no information will be displayed in the Patient List.

Once the user has specified any source directory that contains MPEGVue studies (these may be located on CD/DVD-ROM, DOK or any local hard drive), exam details are displayed (in table format) in the Patient List. The information shown includes *Patient ID*, *Patient Name*, *Exam Date*, *etc*. as seen in the example in Figure 3-191, above.

The current path information is displayed below the Patient List together with details of the removable media (e.g., CD/DVD-ROM). By default, the destination path *Other Folder* radio button is enabled; additional information below shows the Path to destination folder.

b.) Select the appropriate **Current Path Information** - if necessary, click the adjacent **Browse** button and select the correct source directory.

All patient exams found in the currently-selected source directory are listed in the Patient List.

c.) Select the appropriate **Path to Destination Folder** - if necessary, click the adjacent **Browse** button and select the required directory.

d.) From the Patient List, select the required exam/s to be copied.

If the currently-selected source directory is CD/DVD-ROM (read-only media), the *Copy Selected Patients* button is now enabled, as shown in Figure 3-192 below.

Note: If the currently-selected source directory is DOK or the local hard drive, the *Delete Selected Patients* and the *Move Selected Patients* buttons are also now enabled.

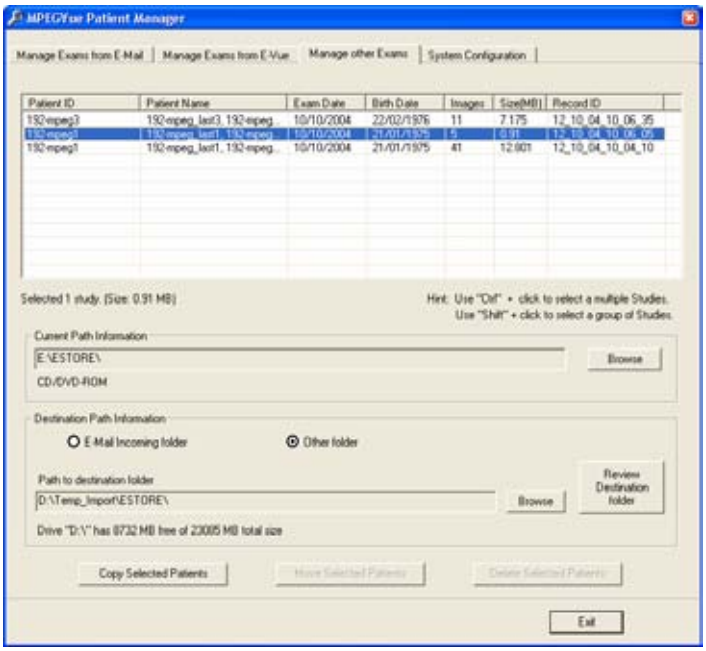


Figure 3-192 Exams Selected for Copying

e.) Click the **Copy Selected Patients** button.

During the copy operation, the following message and progress bar is displayed:

When done, the currently-selected exam/s are available in the destination folder for review.

5.) If required, access the **System Configuration** utility, as follows:

a.) Make sure the System Configuration tab is activated as shown in Figure 3-193.

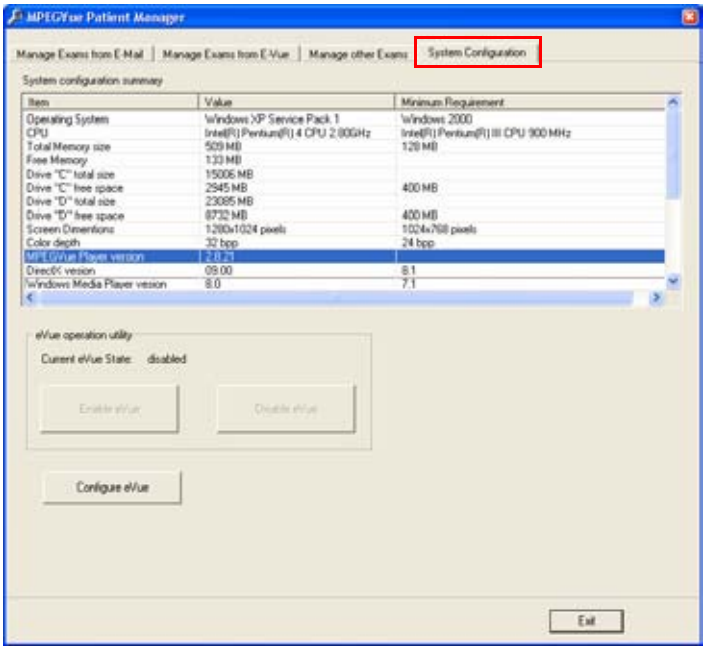


Figure 3-193 MPEGVue Patient Manager Window - System Configuration Tab

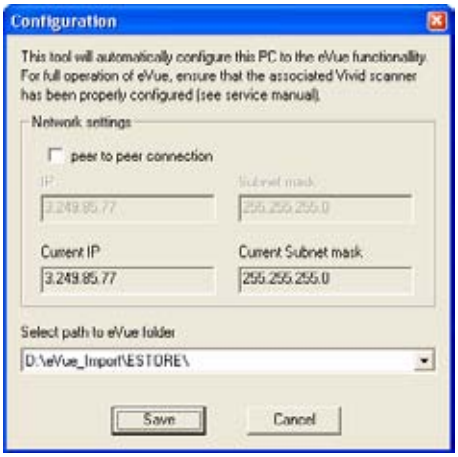
System Configuration read-only information is displayed (in table format) under the following column headings: *Item*, *Value*, *Minimum Requirements.*

Below this information, the **eVue Operation Utility** buttons enable the user to *enable* or *disable* the eVue mode, as required. An additional button (**Configure eVue**) is used to perform the eVue configuration procedure.

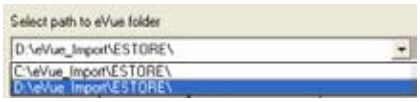
Note: In order to enable eVue operation, it is necessary to first perform the eVue configuration procedure as described in the following step.

b.) Configure eVue (if required), as follows:

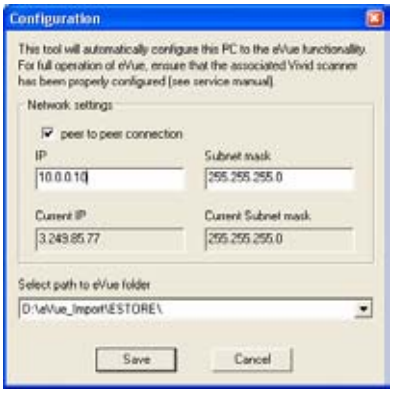
Click the **Configure eVue** button. The Configuration dialog box opens:



Select the required eVue folder destination drive:



If applicable, enable the **peer-to-peer connection** check box then type the correct current IP address and Subnet mask details:



Click **Save** to save the new configuration.

The Enable eVue button is now active, as shown in Figure 3-194 below.

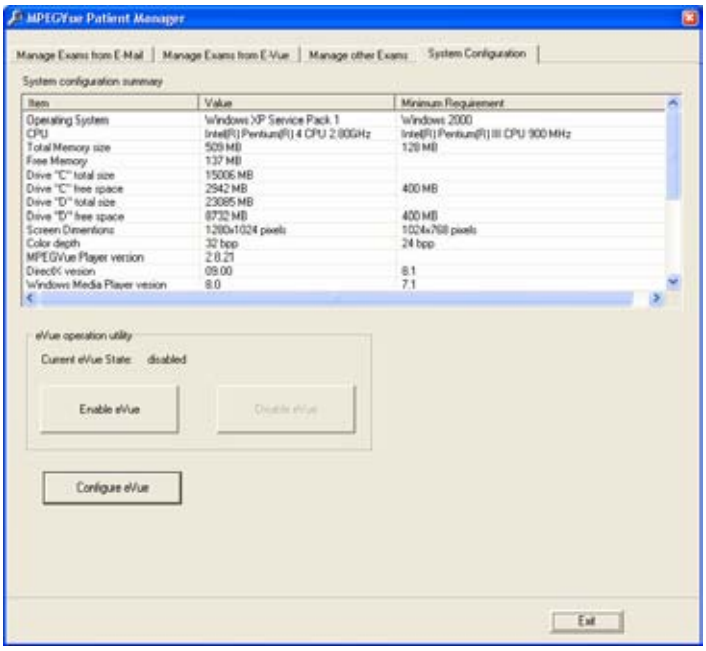


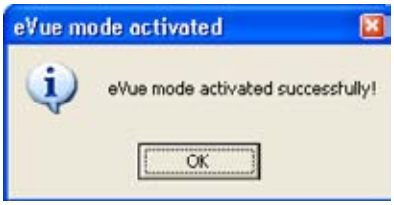
Figure 3-194 System Configuration - Ready to Enable eVue Mode

NOTICE

IMPORTANT To avoid system configuration inconsistencies, before using the **Enable eVue** or **Disable eVue** functions, make sure that your PC is connected to the appropriate network and that all network cables are properly connected. Otherwise, configuration of your PC may become incorrect and the Configuration utility will be unable to execute the *Enable eVue* or *Disable eVue* operations.

In cases of a peer-to-peer connection, before using **Enable eVue** always make sure the two computers (Vivid-i™/ Vivid-q™ scanner and your PC) are properly configured and connected directly.
Before using **Disable eVue**, your PC should be connected back to the local network.

c.) Click the **Enable eVue** button to activate the eVue operation.
The following message is displayed:



Click **OK** to close the message.

Note: The *Disable eVue* button is now active.

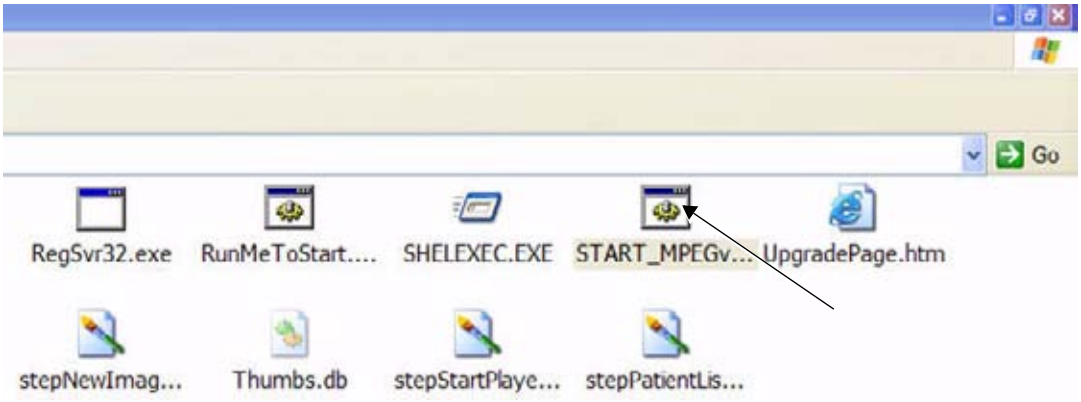
d.) When required, click the **Disable eVue** button to de-activate the eVue operation.
The following message is displayed:

3-8-9-3-13 Using MPEGVue Player

1.) On the remote computer, open the media (CD or Memory Stick) containing the MPEGVue files, or the folder which was set as being shared for import of eVue files.

2.) On the remote computer, open the folder which was set as being shared for import of eVue files.

3.) Double-click on the START_MpegVue Player icon, as shown below:

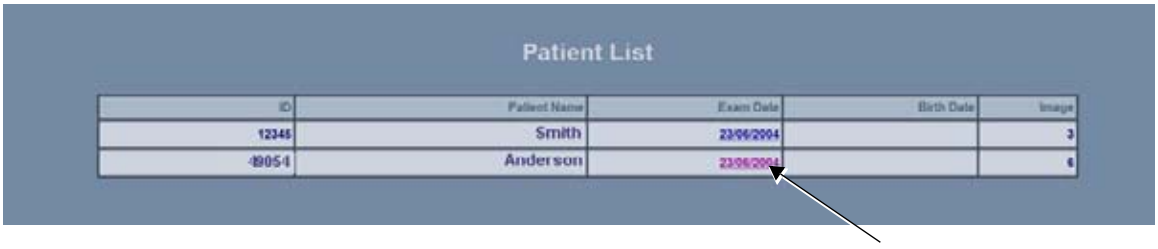


Note: On most computers, when inserting the DVD/CD media with MpegVue files, the MpegVue Player will start automatically (due to the autoplay option of DVD/CD media).

In the event that any updates are required on the remote computer, the program will prompt the user to install the appropriate components, as necessary. (Follow the on-screen instructions).

When done, the Patient List is displayed.

4.) From the Patient List, double-click on the required examination **Exam Date** (see the example below) to select and display images of that exam.



The Image Review window opens, displaying thumbnail pictures of all the currently-selected patient's images - see Figure 3-195 on page 3-184.

Figure 3-195 Image Review Window

5.) From thumbnails mini-pictures (on the left of the screen), select one for review.

The selected image is displayed in the Image Review window.
As new images are transferred to the remote computer, a message is displayed at the bottom of the image currently being reviewed.

6.) Press <**F5**> to refresh the screen.

Additional thumbnail pictures will be displayed accordingly.

Note: The MpegVue Player can be used as a regular player, using the *Play*, *Stop*, *Forward*, and *Rewind* buttons. In addition, the user can forward images by e-mail, save images, and perform measurements, as previously described.

The MpegVue Player displays two rows of command keys at the bottom of the screen. If the remote computer is set up to view many Tool Bars, the lower row of the MpegVue command keys might not be visible. Therefore, it is recommended to remove most Tool Bars (by selecting <View> <Tool Bars> and un-checking all tools that are not required) until both lines of command keys are visible, as shown below.

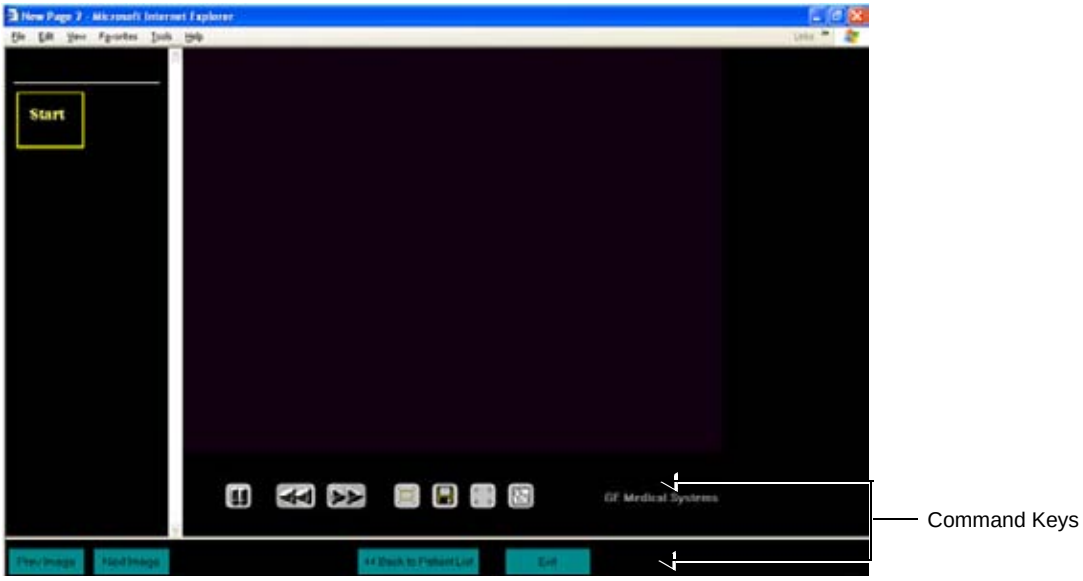


Figure 3-196 MPEGVue Player - Command Keys

Section 3-9
Storing and Transporting the Unit

The Vivid-i™/ Vivid-q™ ultrasound unit mounted on a SafeLock cart weighs up to 45 kg (99 lbs), depending on the configuration. To avoid equipment damage and ensure maximum safety while transporting or moving the unit, the following precautions are recommended:

- Before moving, disconnect all peripheral cables from the system.
- While moving the unit, follow all safety precautions, as described in the *Safety Precautions for Moving the Vivid-i™/ Vivid-q™ Unit* section, below.
- When transporting the unit by vehicle, or shipping by air or any other means:
  - Eject the lithium ion battery from the unit
  - Pack the unit in the original packing. Refer to the information in Unpacking the Cardboard Shipping Carton on page 3 - 7.
  - Follow all safety precautions.
  - Handle with care.
- When reinstalling the unit, always check *both* ends of any cable connections to the system (e.g. peripherals) to ensure cables are properly connected. Confirm that all switches are in the correct position (e.g. the power switch on the DVD/CD-RW device). Allow sufficient system acclimation time, as described in the *System Acclimation Time* section, on page 3-2.

3-9-1 Safety Precautions for Moving the Vivid-i™/ Vivid-q™ Unit

CAUTION: Whenever moving the Vivid-i™/ Vivid-q™ ultrasound unit while mounted on the SafeLock Cart, always observe the following safety precautions:

1) Proceed cautiously when crossing door or elevator thresholds. Grasp the front handle grips or the back handle bar, and then push or pull. **DO NOT** attempt to move the unit by pulling its cables or probe connectors.
2) Ensure that the unit does not strike walls or door frames.
3) Ensure that the pathway is clear.
4) Move the unit slowly and carefully.
5) Take extra care while moving the unit long distances and on inclines.
6) Avoid ramps with an incline of greater than ten degrees to prevent the unit from tipping over. Once the destination is reached, lock the front wheel brakes.

3-9-2 Cardboard Shipping Carton and Packaging Materials

Verify that the required packing materials are available. All these materials are required to safely package and transport the Vivid-i™/ Vivid-q™ ultrasound unit (and SafeLock Cart, if applicable) in the cardboard shipping carton for shipment by vehicle, or any other means.

For more details, refer to the appropriate procedure for Unpacking the Cardboard Shipping Carton on page 3 - 7 and follow the instructions in reverse order.

Section 3-10
Completing the Installation Paperwork

NOTE: On completion of a Vivid-i™/ Vivid-q™ ultrasound scanner installation, it is important to record the relevant System Installation details (see Table 3-10 below) and Product Locator Installation details (see Figure 3-197 on page 3-187), for future reference.

3-10-1 System Installation Details

Enter the serial number printed on the main label (refer to the *Product Labels and Icons* section, on page 1-10), and the other relevant system installation details into the following table:

Table 3-10 System Installation Details

System S/N:	
Location:	
Date:	
Customer Name:	
Service Engineer's Name:	
Comments:	

3-10-2 Product Locator Installation

NOTE: During and after installation, the documentation (i.e. User Manuals, Installation Manuals...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

1) Verify that all details have been entered in the System Installation Details form, as described in the *System Installation Details* section, above. If this form has not been completed, enter the details now.

2) Locate the Product Locator Installation Card(s) that are affixed to the monitor and to each of the peripherals, and fill in all details on both the front and back of the card(s) - see Figure 3-197 on page 3-187.

Note: Step 2 may have been completed already by GE personnel.
The Product Locator Installation Card shown in Figure 3-197 may not be identical to the card(s) provided.

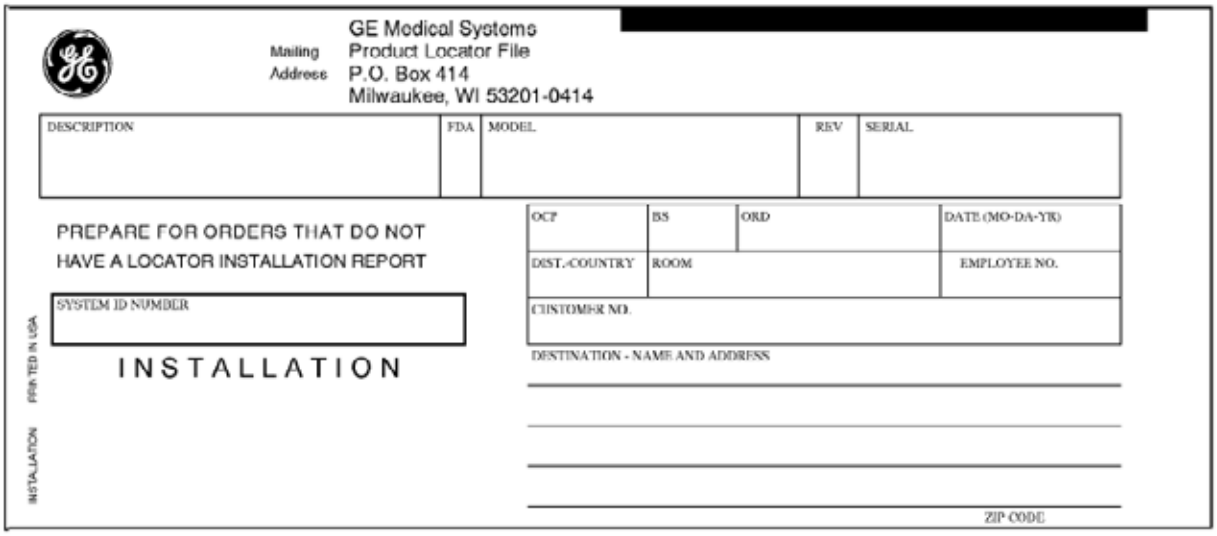


Figure 3-197 Product Locator Installation Card (ICD)

3.) Mail the Product Locator Installation Card(s) to the appropriate product center.

3-10-3 User Manual(s)

Check that the correct *Vivid-i™/Vivid-q™ User Manual* for the system (and relevant software revision), is included with the installation. Specific language versions of the *Vivid-i™/Vivid-q™ User Manual* may also be available. Check with your GE Sales Representative for availability.

During and after installation, supplementary documentation (such as, *User Manuals* and *Installation Manuals* for the peripherals) must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose of Chapter 4

This chapter describes the functional checks that must be performed either as a part of the installation procedure, or as required during servicing and periodic maintenance of the Vivid-i™/ Vivid-q™ ultrasound scanner.

Note: Refer to *Chapter 7 - Diagnostics/Troubleshooting* for detailed descriptions of some of the functional checks described in this chapter.

Table 4-1 Contents in Chapter 4

Section	Description	Page Number
4-1	Overview	4-1
4-2	General Procedures	4-2
4-3	Functional Checks	4-19
4-4	System Turnover Checklist	4-39
4-5	Site Log	4-40

4-1-2 Specific Equipment Required

- An empty (blank) MO Disk;
  - P/N: 066E0490 (1.3 GB)
  - P/N: 066E0519 (5.4 GB)
  - P/N: 066E0514 (8.6 GB)
- ECG Pads
- ECG Cable:
  - AHA/AMERICAS, P/N:2378938

    OR
  - IEC / EUROPE, ASIA, ROW, P/N: 2378938-2
- At least one probe (ideally you should check all the probes used on the system by the site.)

  See Available Probes on page 3 - 64, for an overview of available probes.

Section 4-2
General Procedures

4-2-1 Overview

Since some general procedures are used more than others, for convenience, all the procedures described in this section are listed below:

- *Service Dongle (HASP)* section, below
- *Exit to Windows from the Vivid-i™/ Vivid-q™ Application section*, page 4-4
- *Power ON/Boot-up section*, page 4-4
- *Power Shut Down section*, page 4-8
- *Log On to the System as ADM section*, page 4-11
- *Using Removable Media section*, page 4-12
- *Labeling Removable Media section*, page 4-15
- *Formatting Removable Media section*, page 4-15
- *Verifying Removable Media section*, page 4-16
- *Archiving and Loading Presets section*, page 4-16

4-2-2 Service Dongle (HASP)

A Service Dongle and a proprietary GE Service password are necessary for use by GE Service when performing proprietary level diagnostics such as, accessing the desktop on the BEP. The password changes at specific intervals.

1.) Power down the unit, see *Section 4-2-5* on page 4-8.

2.) Ensure that your Service Dongle is connected to the USB port at the rear of the system.

Figure 4-1 Service Dongle Connected to USB Port

3.) Power ON the unit, see *Section 4-2-4* on page 4-4.

During boot-up, if a Service Dongle is plugged in, the system detects the dongle and then displays the Maintenance Access dialog box, as shown below.

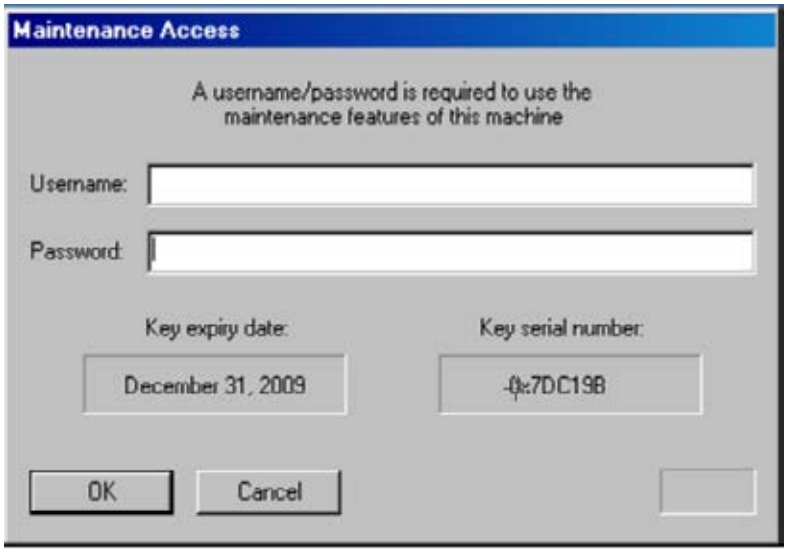


Figure 4-2 Maintenance Access Dialog Box

4) Leaving the User Name field empty, type the current GE service password in the **Password** field.

5) Click **OK**.

   The following important message is displayed:

   READ THIS NOTE BEFORE CONTINUE:
   After you have pressed OK, the Start Application dialog will be displayed on screen. Be ready to *press* MAINTENANCE... *before the Time Bar is "full", or the Vivid-i™/ Vivid-q™ application software will be started. (A description on how to recover, if you fail to click* MAINTENANCE *is included, but you will spend extra time doing this).*

6) After reading the message, click **OK**.

   The Start Application dialog box is displayed

7.) Click the **Maintenance** button to enter *Maintenance Mode*.

The Maintenance dialog box is displayed:

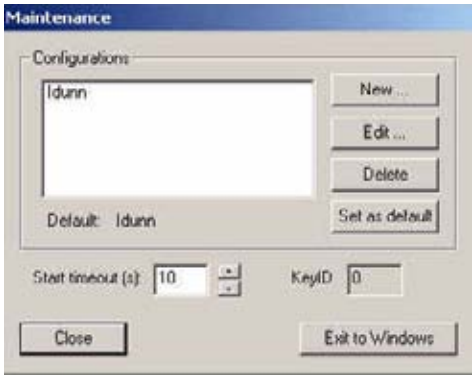


Figure 4-3 Maintenance Dialog Box

8.) Click the **Exit to Windows** button to display the Windows Desktop on the screen.

4-2-3 Exit to Windows from the Vivid-i™/ Vivid-q™ Application

NOTE: Follow these steps if you want to exit to the Windows Desktop when the Vivid-i™/ Vivid-q™ application is active. The Service Dongle must be plugged in to one of the USB ports.

1.) On the Alphanumeric Keyboard, press <**Ctrl**>+**Alt**+**R**.

This will display either the Start Application dialog box (continue with step 2), or the Maintenance dialog box (continue with step 3).

2.) If the Start Application dialog box is displayed, click **Maintenance** to enter *Maintenance Mode*.

This will display the Maintenance dialog box.

3.) In the Maintenance dialog box, select **Exit to Windows**.

This will display the Windows Desktop on the screen.

4-2-4 Power ON/Boot-up

4-2-4-1 Connecting Mains Power to the Vivid-i™/ Vivid-q™ Ultrasound Unit

DANGER: To avoid the risk of fire, power to the system must be supplied from a properly rated outlet. It is recommended to use a dedicated power outlet. The power plug should not, under any circumstances, be altered to a configuration rated less than that specified for the current. DO NOT use an extension cord or adaptor plug. Refer to the *Electrical Requirements* section, on page 2-3 for more details.

DANGER: ALWAYS CONNECT THE UNIT TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR.

DANGER: NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.

DANGER: ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED).

NOTICE Use only power supply cords, cables and plugs provided by or designated by GE Medical Systems.

CAUTION: The system requires all covers.
Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

NOTE: When turning on a system from standby mode, it takes a few seconds before it responds. Do not push the On/off button again during this period. A second push will initiate a full shutdown.

NOTE: If the unit has been in the OFF condition for an extended period of time, (3 to 5 days or more), the unit may not boot, or may beep when turned on..

NOTE: If the system cannot boot up, or it boots up with a PS communication error, refer to the instructions for BIOS Battery Replacement on page 8 - 52.

Follow These Steps to Connect Mains Power to the Unit

Connecting the Vivid-i™/ Vivid-q™ ultrasound unit involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1) Ensure that the wall outlet is of appropriate type, and that the power switch is turned OFF.
2) Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3) Verify that the power cable is without any visible scratches or any sign of damage.
4) Verify that the on-site mains voltage is within the limits indicated on the rating label on the base of the Vivid-i™ and Vivid-q™ portable ultrasound scanner.
5.) Connect the Mains Power Cable female plug via the AC Adapter to the Power Inlet (DC IN - refer to Figure 4-4) at the rear of the unit.

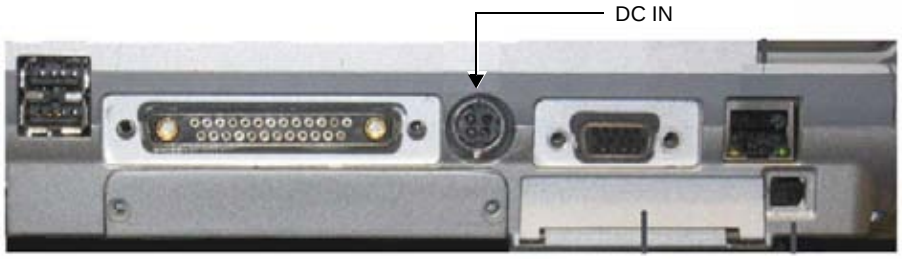


Figure 4-4 Mains Power Connector - Rear Panel

6.) Connect the other end (male plug) of the Mains Power Cable to a hospital-grade mains power outlet with the proper rated voltage.

The unit is now ready for Power ON/Boot Up.

4-2-4-2 Turning the System ON

1) Verify that the ultrasound unit has been connected to the mains power wall outlet via the AC connector on the rear of the system (as previously described) and that mains power is turned ON.

NOTICE When AC power is applied to the scanner, the **On/Off** button on the control console illuminates amber, indicating the Back-end Processor is in *Standby* mode.

2) Hold down the **On/Off** button (Figure 4-5) on the control panel for 3 seconds. The system automatically performs an initialization sequence which includes the following:

- Loading the operating system.
- Running a quick diagnostic check of the system.
- Detecting connected probes.

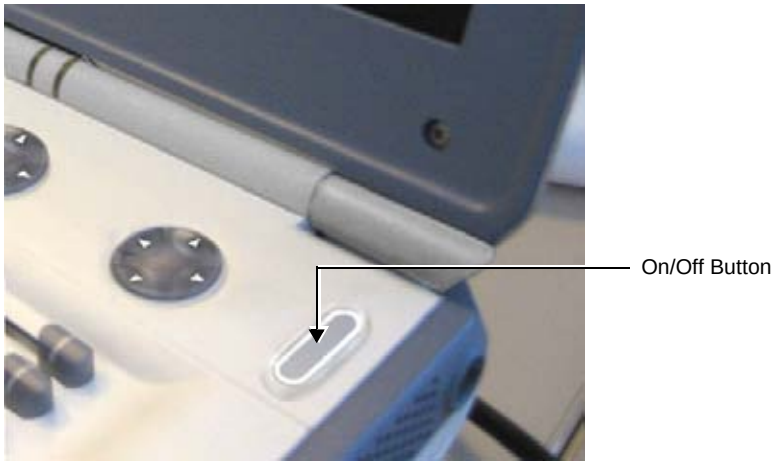


Figure 4-5 On/Off Button on Control Panel

During a normal boot, you may observe that:

a.) The unit's ventilation fans starts on full speed, but slow down after a few seconds (listen to the fan noise).

b.) Power is distributed to the peripherals, Operator Panel (control panel), Monitor, Front-End Processor and Back-End Processor.

c.) The Back-End Processor and rest of the scanner starts with the sequence listed in the following steps:

1.) Back-End Processor is turned ON and starts to load the software.

2.) The Start Screen (Vivid) is displayed on the monitor.

A start-up progress bar indicating the time used for software loading, is displayed on the monitor, as shown in Figure 4-6.

Figure 4-6 Start-up Progress Bar for Vivid-i™

3.) The software initiates and sets up the Front-End electronics and the rest of the scanner.

4.) The Keyboard backlight is lit.

5.) As soon as the software has been loaded, a 2D screen is displayed on the monitor, as shown below.

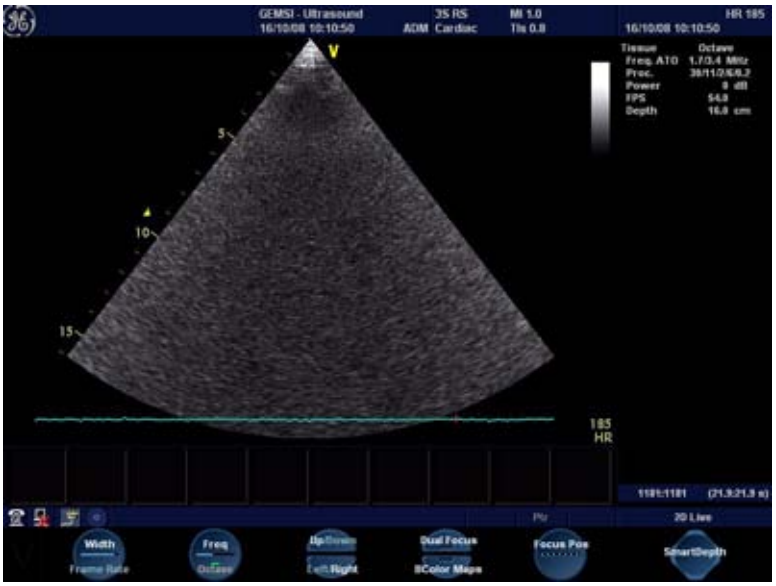


Figure 4-7 2D Screen

NOTE:Total time used for start-up is typically three minutes.

4-2-5 Power Shut Down

When switching the unit OFF, the system performs an automatic shutdown sequence.

NOTE: After turning OFF the system, wait at least 10 seconds before turning it on again. The system may not be able to boot-up if power is recycled too quickly.

The system can be switched OFF in one of three ways, as follows:

- Holding down the **On/Off** button for 3-5 seconds will evoke the display of the System Exit dialog box (see Figure 4-8). From this, you can either select *Full Shutdown* (click the **Shutdown** button) or choose to place the system in *Standby Mode* (click the **Standby** button). Both these procedures are described in detail below.

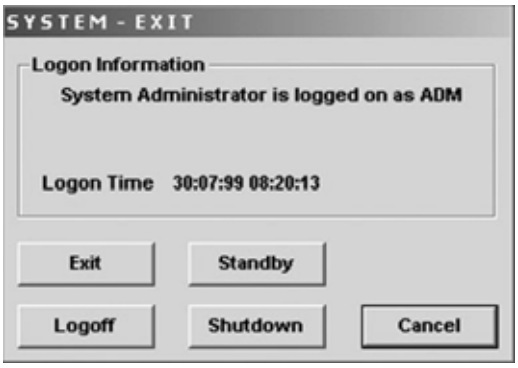


Figure 4-8 System Exit Dialog Box

- Holding down the **On/Off** button for more than 10 secs will cause the system to perform *Emergency Shutdown.* This is not recommended under normal circumstances.
- Closing the lid will place the system in *Standby Mode*.

Note: The system will remain in *Standby Mode* for as long as battery power will allow.

The System - Exit dialog box (Figure 4-8), used when switching OFF the unit, gives you the choices described below.

- **Standby**
  Use this button to select the Standby mode, allowing a shorter reboot time. Most of the system is powered down, but a certain portion of the unit remains energized. The standby mode allows a shorter re-boot time when the system is used on a daily basis or moved from one place to another.
- **Logoff**
  Use this button to log off the current user.
  The system remains ON and ready for a new user to log on.
  (If the Logoff button is dimmed, it indicates that no user is logged on to the unit at the moment.)
- **Shutdown**
  Use this button to Shut Down the system. The entire system is shut down. It is recommended to perform a full shutdown at least once a week.
- **Cancel**
  Use this button to exit from the System - Exit dialog box and return to the previous operation.

4-2-5-1 Standby Mode

Follow the steps below to select Standby Mode

This procedure describes the steps required to power down the unit to Standby mode:

NOTE: Don't press the On/Off button too long. If you press the button too long (more than 3-4 seconds), a full shutdown is started.

1.) Hold down the **On/Off** button for 3-5 seconds to evoke the display of the System Exit dialog box (see Figure 4-8 on page 4-8).
2.) Click the **Standby** button to activate Standby mode.
3.) Leave the mains power cable connected to keep the standby battery fully charged.

Follow steps below if you need to disconnect power cable when unit is in standby mode

1.) Switch OFF the Mains Power from the wall outlet.
2.) Disconnect the power cable.

The system will remain in Standby mode for approximately 15 minutes if the standby battery is fully charged. If the system is unplugged for a longer period of time, a full shutdown is automatically performed.

As described above, the battery is automatically charged when the system is plugged to the wall outlet and the power is switched ON. It takes approximately 10 hours to charge a flat battery.

If the system is left in the OFF condition (system unplugged from the wall out let) for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. Should this occur, the system needs to recharge the batteries. This could take 15 minutes to as long as 10 hours, depending on the battery age, system input voltage and system temperature. To eliminate draining the batteries, the system should remain plugged into the wall outlet with the wall outlet power switch in the ON position.

NOTE: Connect the power cable to the mains power outlet again as soon as possible and at least before you switch on the mains power and press the On/Off button.

NOTE: When turning ON a system from standby mode, it takes a few seconds before it responds. Do not push the On/Off button again during this period. A second push will initiate a full shutdown.

4-2-5-2 Complete Power Down

NOTE: This function is not available from Standby mode.

Follow this procedure to perform a complete system power-down

1.) Hold down the **On/Off** button for 3-5 seconds to evoke the display of the System Exit dialog box (see Figure 4-8 on page 4-8).

2.) Select **Shutdown** to do a complete power down of the unit.

The Back-End Processor will first turn OFF the scanner activity and print the message "*Please wait - Shutdown in progress*" in the LCD display. Then system shut down commences.

The time required to power down the unit (including the Back-End Processor), may vary from 10 seconds up to approximately 1 minute. The last component that shuts down is the light in the LCD display, indicating that you may continue with the next step.

3.) Disconnect the mains power from the wall outlet **only after the fans have stopped**. This will cut power distribution within the unit.

If the system is still running when you disconnect the mains power, the internal power supply will switch over to the battery power and supply the system with power until either the battery is drained to 30% capacity (invoking shut down), or shutdown has been invoked by the user.

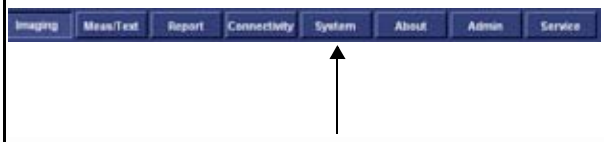
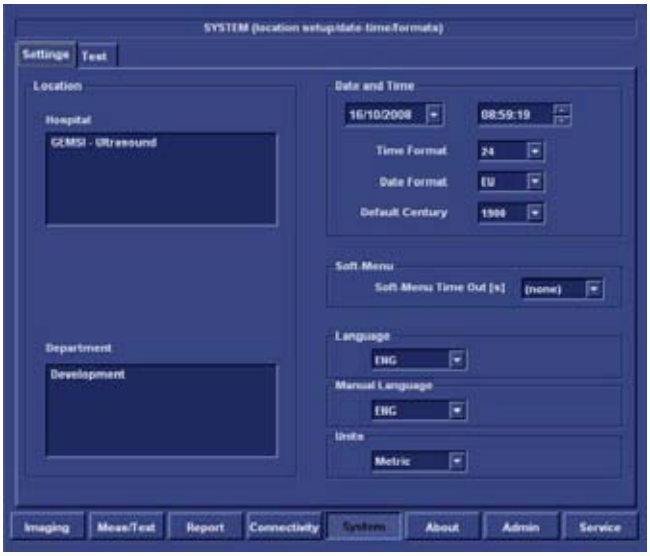
NOTE: To completely remove power from the system, release and remove the battery.

4-2-6 Log On to the System as ADM

Table 4-2 Logging on to the System as ADM

Step	Task	Expected Result(s)
1.	Press **Config** on the alphanumeric keyboard.	If not already logged on, the Operator Login window is displayed. Note: The default password is **ulsadm**
2.	Select the down-arrow to the right of the Operator field to view the Operator pull down list From the factory, these two users are defined without password. - adm - usr It is possible for the administrator (*adm*) to establish unique passwords for each user, but don't do it now.	
3.	Select the user *adm*. - From the factory, the password has been left blank, so you may try to log on without any password. - If the log-on fails, you may try to use the password **service**. - As a last resort, contact the hospital's network administrator (or person responsible for the ultrasound unit), and ask for the password. The Emergency button stores data only from current patient examination.	
4.	Select **Log on**.	- If this is the first time the unit is turned on, the "IMAGING AND ANALYSIS - GLOBAL LEVEL" window is displayed. - If another screen was displayed earlier, before logging out or turning unit off, that screen will be displayed.

Table 4-2 Logging on to the System as ADM (cont'd)

Step	Task	Expected Result(s)
5.	Select System to access the System Setup window. 	The System Settings window is displayed 
6.	Proceed to select the required settings.	

4-2-7 Using Removable Media

4-2-7-1 Introduction

Vivid-i™/ Vivid-q™ is equipped with a Magneto Optical Disk Drive (MOD Drive) and a DVD/CD-RW Drive.

The MOD Drive can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel. This connection must be via a USB-to-SCSI adaptor; one side of the adaptor being connected to the Vivid-i™/ Vivid-q™ USB port, and the other side to the rear of the MOD drive.

When connecting the MOD drive directly to the system, it is necessary to use an additional power source. **As a safety precaution, this must be done via an isolation transformer.**

The MOD Drive may be connected once the system is powered ON, or after shutdown. All software drivers for the MOD Drive are pre-configured and installed designated to be used with the specific MOD drive supplied by GE Medical Systems.

WARNING ***Do not attempt to use a different type of mass storage device other than the MOD Drive supplied with the system. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

4-2-7-2 Install MO Disk in MO Drive

NOTICE **Never move the unit with a MO disk in the Magneto Optical Disk Drive because the drive actuator will not be locked and the Magneto Optical Disk Drive could break.**

1.) Preparations before installing an MO disk in the MOD Drive:

   a.) The unit must be turned ON and "up and running" before using the MOD Drive

   b.) Verify the MO disk for loose hardware or damaged labels which could jam inside the MOD Drive.

   c.) Ensure that the slide switch in one corner of the disk is set so that the disk is write enabled (disk hole closed).

2.) Insert the disk into the MO Disk Drive with the label for the side you intend to use, facing up.

4-2-7-3 Eject and Remove MO Disk from MOD Drive

NOTICE ***Do not eject the MO Disk using the button on front of the MO drive.***

In some cases, the MO Disk is ejected automatically. If not automatically ejected, use the manual ejection method as described in the following steps:

1.) Select the **Eject** button on the screen

OR

Press <**Alt> + E** *on the alphanumeric keyboard to display the Eject Device menu.*

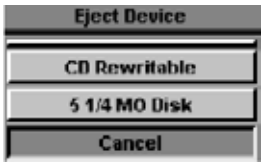


Figure 4-9 Eject Device Menu

2.) Select **5 1/4 MO Disk** in the Eject Device menu to eject the MO Disk.

3.) Remove the ejected MO Disk from the MO Drive and place it in its cover box for storage in a safe place.

4-2-7-4 Connecting External USB Hard Disk to USB Port

The External USB Hard Disk can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

One must use the additional power source (supplied with the External USB Hard Disk) to activate the External USB Hard Disk.

WARNING ***Do not attempt to use a different type of mass storage device other than the External USB Hard Disk supplied with the system. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

Refer to the *External USB Hard Disk Installation Procedure* section, page 8-155 for instructions on initial configuration and connecting the External USB Hard Disk to the Vivid-i™/Vivid-q™ portable ultrasound scanner scanner.

After connecting the External USB Hard Disk to the system, perform the functional checks described in the External USB Hard Disk Test on page 4 - 33.

4-2-7-5 Installing DVD/CD into DVD/CD Drive

Note: IMPORTANT: Use only CD-R, DVD-R or DVD+R media from a reputable vendor and only high-grade media types.

1.)

Press the Eject button on the right side of the DVD/CD Drive once to open the disk tray.

2.) Put a DVD/CD disk into the disk tray with the label side facing up.

3.) Press the Eject button once to close the disk tray.

After a few seconds, the disk is available for reading, formatting or writing, depending on the type of disk you used.

4-2-7-6 Eject and Remove DVD/CD from DVD/CD Drive

NOTICE ***Do not eject the DVD/CD using the button on front of the DVD/CD Drive.***

In some cases, the DVD/CD media is ejected automatically. If not automatically ejected, use the manual ejection method as described in the following steps:

1.) Select the **Eject** button on the screen.

OR

Press <**Alt> + E** *on the alphanumeric keyboard to display the Eject Device menu (Figure 4-9).*

2.) Select **CD-Rewriteable** in the Eject Device menu to eject the DVD/CD media.

3.) Remove the ejected DVD/CD media from the drive and place it in its cover box for storage in a safe place.

4-2-8 Labeling Removable Media

Before you start to format any Removable Media, be sure about what naming convention you will use for labelling.

- Use a logical name and make sure to physically label each Removable Media.
- Verify that each Removable Media is given a unique name. Maximum eleven (11) characters may be used for the label name.
- Remember that MO Disks have two sides, Side A and Side B. Each Side must have a unique name.

Example: MO Disks for storing images may be labeled "IMAGE_1A" (Side A on MO Disk #1), "IMAGE_1B (Side B on MO Disk #2), "IMAGE_2A"...

4-2-9 Formatting Removable Media

This procedure describes how to format an MO Disk or DVD/CD media.

Before you continue, be sure about what naming convention you will use for labelling the Removable Media.

Note: IMPORTANT: Use only CD-R, DVD-R or DVD+R media from a reputable vendor and only high-grade media types.

1.)

Select **Config** > **Connectivity** > **Tools.**

2.) Select the removable media from the *Tools pop-up menu*.

3.) Enter a name for the removable media in the *Label field*.

4.) Press **Format**.

5.) Wait for display of the *Information window,* indicating that the formatting process is completed.

NOTICE ***Do not eject the DVD/CD using the button on the DVD/CD drive.***

6.) Press **<Alt> + E** on the alphanumeric keyboard to display the Eject Device menu (Figure 4-9 on page 4-13)

7.) Select the relevant media.

The selected media is ejected.

4-2-10 Verifying Removable Media

1.) Insert the removable media to be verified.

2.) Select the pre-configured removable media from the **Config** > **Connectivity** > **Tools** pop-up menu.

3.) Press **Verify.**

The unit starts to verify the DICOM directory on the selected media.

4-2-11 Archiving and Loading Presets

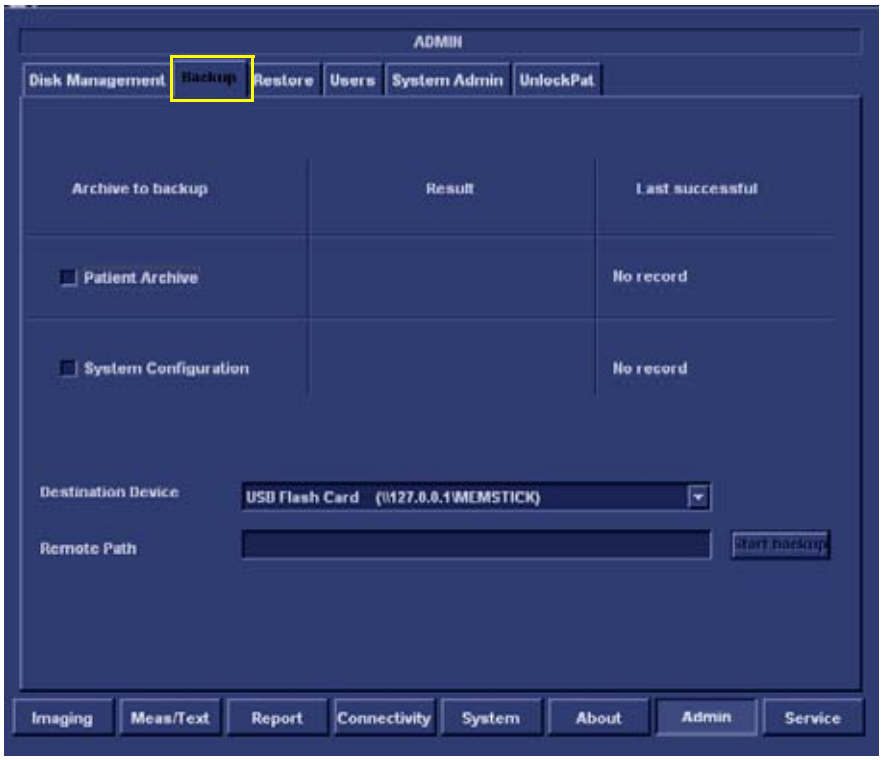
NOTE: Always save presets before any software reload. This action is necessary to ensure that the presets loaded after the software reload are as up–to–date as possible.

All user presets except changes to *Summary*, *Anatomy*, and *Biometry* pages, can be saved on an MO disk for reloading on the system.

NOTICE Presets should not be saved on the same MO disk as images, because the Archive Menu lists the images but not the presets stored on a MO disk.

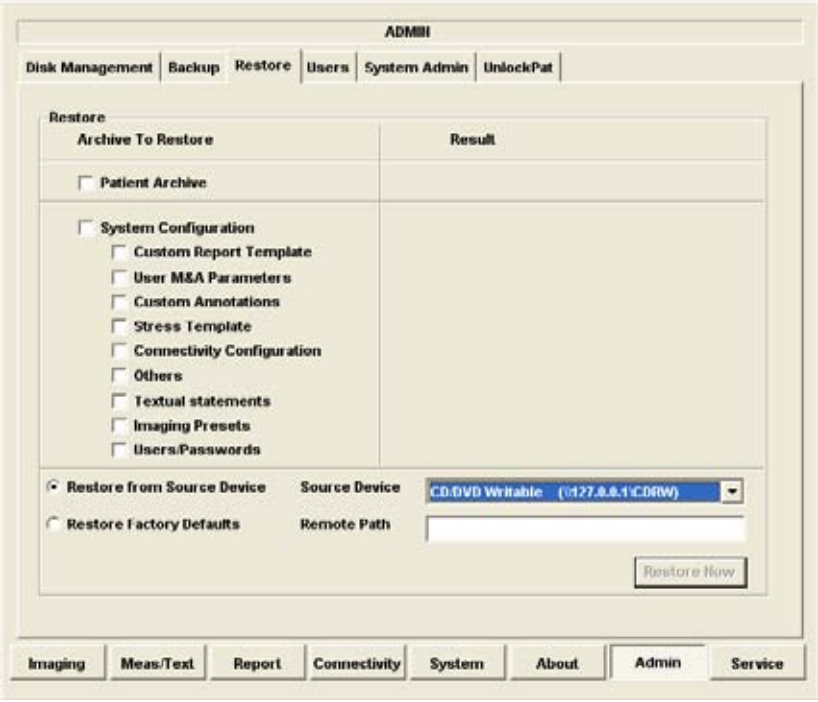
4-2-11-1 Archiving Presets to an MO Disk

Table 4-3 Saving Presets

STEP	TASK	FUNCTION
1.	Insert an empty, formatted MO disk labelled “PRESETS” and marked with Vivid-i™/ Vivid-q™’s serial number and the date, into the MO Drive. For more information about formatting, see Formatting Removable Media on page 4 - 15.	
2.	Press **Config** (or **F2**); select **Admin** then select **Backup**.	The Backup window is displayed. 
3.	Enable the **User Defined Configuration** check box.	
4.	Select the MOD as the Destination.	
5.	Press **Backup Now**.	A copy of the Presets is saved on the MO disk.
6.	Press <**Alt> + E** on the alphanumeric keyboard.	The MO disk is ejected.

4-2-11-2 Loading Presets from an MO Disk

Table 4-4 Loading Presets

STEP	TASK	FUNCTION
1.	Insert the MO disk with the archived presets into the MOD.	
2.	Press **Config** (or **F2**); select **Admin** then select **Restore**.	The Restore window is displayed. 
3.	Enable the **User Defined Configuration** check box.	
4.	Select the MOD as the Source.	
5.	Press **Restore Now**	The Presets are restored to the System.
6.	Press <**Alt> + E** on the alphanumeric keyboard.	The MO disk is ejected.

Section 4-3
Functional Checks

4-3-1 Basic Controls

4-3-1-1 Bearing Handle Test

Table 4-5 Bearing Handle Test - Recommended

Step	Task	Expected Result(s)
1	Disconnect all power supplies and peripherals.	Verify that no peripherals nor power supplies are connected to the system.
2	Move the handle to the maximum lowest position (beneath the system).	Ensure that the system is standing stable.
3	Open the screen	
	Close the screen	
4	Move the handle from the maximum lowest position to the maximum upper position.	Verify that the handle is able to reach the maximum lowest and maximum highest positions smoothly.
5	Pick up the system using the handle.	Ensure that the handle is firmly connected to the system.

4-3-1-2 Alphanumeric Keyboard Test

Table 4-6 Alphanumeric Keyboard Test - Recommended

Step	Task	Expected Result(s)
1	Power-up the System in Normal Scanning Mode	
2	Press **Config** and select **Report**	
3	Select the **Comment Text** Tab	
4	Press all Alphanumeric keys one-by-one. To quickly test every key (each letter in the alphabet), type the following sentence: *The quick brown fox jumps over the lazy dog* Repeat the test, while holding down the Shift key.	As each key is pressed, the corresponding letter is typed on the screen.
5	Use the **Backspace** key to delete the text you typed.	

4-3-1-3 External Keyboard Test

NOTE: The External Keyboard test also includes testing of the following components: TGC Sliders, Rotary, Keyboard backlight, Button backlight, and Active Button.

Table 4-7 External Keyboard Test - Recommended

Step	Task	Expected Result(s)
1	Power-up the System in Normal Scanning Mode	
2	Press **<Alt> F2** to start the diagnostic package.	
3	Highlight the **Keyboard Test** and press <**Start**>	The keyboard Test window opens
4	Trackball to **Connect** and press **Set.**	
5	Press all extended KB keys one-by-one. Press the **Clear** soft button to clear the Event window.	The extended KB keys activate properly. Every hit on a key is followed by two rows (Depress/Release).
6	Perform the TGC Slider Test, as follows: d.) Move all TGC sliders to the *left* position	The position value is 0 (+2) for all TGC Sliders
	e.) Move all TGC sliders to the *right* position	The position value is 63(-2) for all TGC Sliders
	f.) Move all TGC sliders to the *central* position	The position value is 31(±2) for all TGC Sliders
7	Perform the **ROTARY TEST**, as follows: Rotate the rotary (in both directions) and press the button at the center of the rotary.	The rotary is activated properly; pressing on the button will display a row of data for pressing and another row of data for releasing (Depress/Release).
8	Perform the **ALPHANUMERIC KEYBOARD BACKLIGHT TEST**, as follows: a.) Change the combo box near the **Front Panel** button to **Reset to power up conditions** and press the **Front Panel** button	
	b.) Change the combo box near **Front Panel** button to **Enable transmission** and press the **Front Panel** button.	
	c.) Set the Keyboard Backlight to 255	All Alphanumeric Backlight LEDs are seen with same intensity acceptable for the maximum level.
9	Perform the **BUTTON BACKLIGHT TEST**, as follows: a.) Change the combo box near the **Front Panel** button to **Reset to power up conditions** and press the **Front Panel** button	
	b.) Change the combo box near **Front Panel** button to **Enable transmission** and press the **Front Panel** button.	
	c.) At the **Indicators** frame set Indicator – ID to the **All** position. Select **ON** and **Backlights**.	
	d.) Press the **Test Software** button	All Backlight LEDs except the TGC sliders and the Rotary are seen with same intensity acceptable for the maximum level.

Table 4-7 External Keyboard Test (cont'd)- Recommended

Step	Task	Expected Result(s)
10	Perform the **BUTTON ACTIVITY TEST**, as follows: a.) Change the combo box near the **Front Panel** button to **Reset to power up conditions** and press the **Front Panel** button	
	b.) Change the combo box near **Front Panel** button to **Enable transmission** and press the **Front Panel** button.	
	c.) At the **Indicators** frame set Indicator – ID to the **All** position. Select **ON** and **Activity**.	
	d.) Press the **Test Software** button	All 10 Activity green LEDs and KB backlights are seen with maximal intensity
11	Perform the **STATUS INDICATOR TEST**, as follows: a.) Check the **Battery green** check box. Press **Set**.	Battery green LED is On
	b.) .Uncheck the **Battery green** check box. Check the **Battery yellow** check box**.** Press **Set**	Battery yellow LED is On
	c.) Uncheck the **Battery yellow** check box. Check the **Extern DC green** check box**.** Press **Set**	Extern DC green LED is On
	d.) Uncheck the **Extern DC green** check box. Check the **Extern DC yellow** check box**.** Press **Set**	Extern DC yellow LED is On
12	Perform the **LID BUTTON TEST**, as follows: a.) Press the **Diagnostic Info** button.	
	b.) Place the test upper cover magnet close to the Alphanumeric Keyboard Escape button.	The status of the Lid switch is "Open" and changes to "Closed "after the magnet was placed.
13	Perform the **POWER BUTTON TEST**, as follows: a.) Press the **Diagnostic Info** button. Press the **Power** button.	The status of the Power Button is "Open" and changes to "Closed "when the power button is pressed.
	b.) Press the **Disconnect** and **Close** buttons to close the test application.	

4-3-1-4 Trackball Test

Table 4-8 Trackball Test - Recommended

Step	Task	Expected Result(s)
1	Boot-up the System in Regular Scanning Mode	
2	Press **Config**	
3	Under the **Connectivity** tab, select **TCPIP** then **Advanced Settings**	
4	Click on **View**	
5	In the address bar, type **Desktop** and press <**Enter**>	
6	Select **My Docs** > **My Picture**s and double-click on one of the pictures to open the Paint application.	
7	From the Paint window, make sure that when moving the trackball you have good control and that the x and y coordinate values (displayed at the bottom of the screen) move digit-by-digit up and down.	Movement is smooth (no jumping) and the trackball has no “dead” areas (i.e., when the trackball is moved there are no areas in which no changes are seen).

4-3-1-5 System ID Test

Table 4-9 System ID Test - Recommended

Step	Task	Expected Result(s)
1	Boot-up the System in Regular Scanning Mode	
2	Press **Config**	
3	Under the **Connectivity** tab, select **TCPIP** then **Computer Name**	
4	Make sure the computer name is System ID	
5	Select **Advanced Settings**	
6	Type **Desktop** and press <**Enter**>	
7	Select **My Computer** and press **Menu**	
8	From the drop-down menu, select **Properties** and then select the **Computer Name** tab.	
9	Make sure the System ID is indicated under the computer description.	The computer description matches the system ID.

4-3-1-6 Speakers Tests

Table 4-10 Speakers Test - Recommended

Step	Task	Expected Result(s)
	BEP Path:	
1	Boot up the system in Maintenance Mode, using the Service Dongle.	
2	Press **Alt +Config** to start the diagnostic package	
3	From the diagnostic test tree, select **BEP**. This will activate PC Doctor diagnostics.	
4	Run **System Diagnostics\Audio Test**	
5	At the WAV window, press the **Left Channel** button	Make sure that the *left* internal speaker is working Verify that there is clear sound from both speakers at all frequencies. Note that *right* and *left* are as seen when standing behind the unit.
6	At the WAV window, press the **Right Channel** button	Make sure that the *right* internal speaker is working Verify that there is clear sound from both speakers at all frequencies. Note that *right* and *left* are as seen when standing behind the unit.
	RFI Path:	
1	From the diagnostic test tree, select **Front End Test** > **RFI**. Then select **RFI Audio Test** and press **Start**.	During the test, a high-pitched sound will be heard from the *left* and *right* speakers simultaneously and the circuitry test will indicate Pass

4-3-1-7 Microphone Test

Table 4-11 Microphone Test - Recommended

Step	Task	Expected Result(s)
1	Boot up the system in Maintenance Mode, using the Service Dongle.	
2	Press **Alt +Config** to start the diagnostic package	
3	From the diagnostic test tree, select **BEP**. This will activate PC Doctor diagnostics.	
4	Run **System Diagnostics\Microphone Test**	
5	At the PCDR Microphone window, press the **Record** button and start talking “1, 2, 3, 4, 5”	
6	When done, press **Play**	The playback sounds loud and clear.
7	When done, press **Close** The system will prompt: Did the test pass? Respond accordingly.	

4-3-1-8 Monitor Test

This procedure is performed in stages, in the order shown in the table below. First, verify the monitor settings and then proceed with the tests that follow.

Table 4-12 Monitor Test - Recommended

Step	Task	Expected Result(s)
	VERIFY MONITOR SETTINGS	
1	Boot up the system in Maintenance Mode, using the Service Dongle.	
2	Press **Config**	
3	Under the **Connectivity** tab, select **TCPIP**	
4	Select **Advanced**	
5	In the address bar, type **Controlbar** and press **Enter**	
6	From the Control Panel, select **Display** then select **Settings**	Make sure resolution is set to 800 x 600 pixels, 16 bit. If not, select the correct resolution settings.
7	From the **Settings** Tab, select **Advanced**. Select **S3GammaPlus** tab	Make sure the settings are: • Gamma = 0.7 • Brightness = 1 • Contrast = 1
8	When done, press **OK** to close all windows.	
	LCD PIXEL TEST:	
1	Boot-up the System in Regular Scanning Mode	

Table 4-12 Monitor Test (cont'd) - Recommended

Step	Task	Expected Result(s)
2	Press **Alt +Config** to start the diagnostic package	
3	From the diagnostic test tree, select **BEP**. This will activate PC Doctor diagnostics.	
4	Run **System Diagnostics\Monitor Test**	
5	Select **Solid Test**.	No missing pixels in R/G/B tests
6	Select **Red**	Make sure there are no missing pixels in the Full Screen Red or display in another color
7	Select **Green**	Make sure there are no missing pixels in the Full Screen Green or display in another color
8	Select **Blue**	Make sure there are no missing pixels in the Full Screen Blue or display in another color
9	When done, press **Close** The system will prompt: Did the test pass? Respond accordingly.	
	EXTERNAL MONITOR TEST:	
1	Connect the external monitor to the system	
2	Boot-up the System in Regular Scanning Mode	
3	Press **Config**	
4	Under the **Connectivity** tab, select **TCPIP**	
5	Select **Advanced**	
6	In the address bar, type **Controlbar** and press **Enter**	
7	From the Control Panel, select **Display** then select **Settings**	
8	From the **Settings** Tab, select **Advanced**. Select **S3Display** tab	Make sure the CRT check box is activated.
9	When done, press **OK** to close all windows.	
10	Press **Alt +Config** to start the diagnostic package,	
11	From the diagnostic test tree, select **BEP**. This will activate PC Doctor diagnostics.	
12	Run **System Diagnostics\Monitor Test**	
13	Select **Combination Test**.	
14	Follow the on-screen instructions.	PASS
15	When done, press **Close** The system will prompt that the test passed.	

4-3-1-9 ECG/Respiratory Test

Table 4-13 ECG/Respiratory Test - Recommended

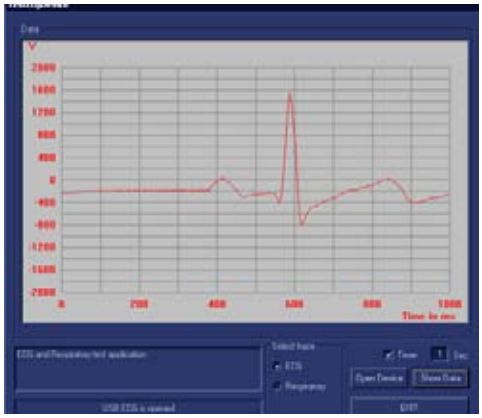
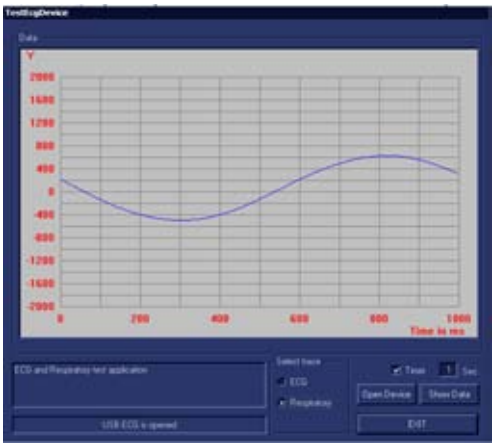
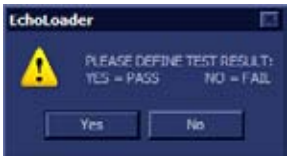
Step	Task	Expected Result(s)
1	Boot up the system in Maintenance Mode, using the Service Dongle and load the application by double-clicking the **Echoloader** icon on the desktop.	
2	Connect the ECG cable to the input on the ECG port on the right side of the Vivid-i™/ Vivid-q™ scanner. Connect a Cardiac probe (for example, 3S-RS) and press on **Physio**. Set ECG as OFF and Int/Resp as ON. Connect the ECG leads to yourself (as the simulated patient). Refer to the instructions in the Vivid-i™/Vivid-q™ User Manual.	
3	Press **Alt + Config** to enter into Diagnostics Mode	
4	From the Diagnostic Test tree, select **BEP**.	
5	Run the **ECG Test**	
6	From the Test ECG device window, set the resolution to 1 second and press the **Open Device** button	
7	Verify that a single clear QRS signal is displayed.	
	If applicable, proceed to run the **Respiratory Test**, as described below.	

Table 4-13 ECG/Respiratory Test - Recommended

Step	Task	Expected Result(s)
8	Activate the Respiratory radio button.	The Respiratory signal is displayed in the Data area, as shown in the example below: 
9	Verify that a single clear Respiratory signal is displayed.	
10	When done, trackball to the **Exit** button and press **Set**.	
11	When prompted by the following message, select **Yes** or **No** as applicable. 	
12	Press the <**Esc**> button on the keyboard to close the Diagnostic Test window.	
13	When done, press **Exit** button	

4-3-1-10 Front End Test

Table 4-14 Front End Test - Recommended

Step	Task	Expected Result(s)
1	Boot up the system in Maintenance Mode, using the Service Dongle.	
2	Press **Alt + Config** to enter Diagnostics Mode	
3	From the Diagnostic Test tree, select **Front End Tes**t.	
4	Run **Full System Test** and press **Start**	PASS
5	Connect the 3S-RS probe to the probe port.	
6	From the Diagnostic Test tree, select **Front End Test**.	
7	Select **TR32** then select **TX**. Select **TXProbeTX Tes**t and press **Start**	PASS
8	Select **MUX Test** then select **3S-RS Test** and press **Start**	PASS
9	Select **TR32 Test** then select **RX Tes**t. Select **RSTest with 3S-RS** and press **Start**	PASS
10	When done, press the **Esc** button	

4-3-1-11 CW Test

Table 4-15 CW Test - Recommended

Step	Task	Expected Result(s)
1	Boot-up the System in Regular Scanning Mode	
2	Press **Alt + Config** to enter Diagnostics Mode	
3	From the Diagnostic Test tree, select **Front End Test**.	
4	Run **Full System Test** and press **Start**	PASS
5	Connect the 3S-RS probe to the probe port.	
6	From the Diagnostic Test tree, select **Front End Tes**t.	
7	Select **TR32** then select **TX**. Select **TXProbeTX Test** and press **Start**	PASS
8	Select **MUX Test** then select **3S-RS Test** and press **Start**	PASS
9	Select **TR32 Test** then select **RX Tes**t. Select **RSTest with 3S-RS** and press **Start**	PASS
10	When done, press the **Esc** button	

4-3-1-12 Visual Test

Table 4-16 Visual Test - Recommended

Step	Task	Expected Result(s)
1	Insert 3S-RS probe.	
2	Increase the gain to see the homogenous noise.	The probe ID is 3S-RS. No strikes or artefacts are present.

4-3-2 Peripherals

4-3-2-1 VCR Test

Table 4-17 VCR Test - Recommended

Step	Task	Expected Result(s)
1	Connect a Mitsubishi 9600 VCR and video converter to the system, restart the system and load an SVHS cassette.	Verify that you follow all the procedure instructions described in Connecting the VCR on page 3 - 52.
2	Connect an external monitor to the VCR S-Video or Video output.	
3	Connect a 3S-RS probe. Reset the VCR counter and press the **VCR Record** button.	Verify that the recording indicator (red dot) is displayed on the VCR and the tape counter is running on the VCR.
4	Activate CW Mode and record 2 minutes of heart scanning or a similar effect using a phantom.	Record 2 minutes of CW scanning.
5	Stop recording and rewind the cassette. Press the **Play** button on the VCR.	The recorded Image is played back.
6		Verify that in CW Mode both the *left* and *right* audio channels are working, and that the played-back audio is similar to the recorded audio in both the *left* and *right* speakers, when applicable.

4-3-2-2 B/W and Color Printer Test

Table 4-18 B/W Printer Test - Recommended

Step	Task	Expected Result(s)
1	Scan a phantom or suitable interface in 2D-Mode.	
2	Press the **Freeze** button.	The image scanning stops with the latest picture frozen on the screen.
3	Press the **Print** button.	Evaluate the print quality. Adjust the *brightness* and/or *contrast* of the B/W printer, if required. The image displayed on the screen is printed on the B/W or color printer, depending upon the key assignment configuration.

4-3-2-3 Color Printer Test

Table 4-19 Color Printer Test - Recommended

Step	Task	Expected Result(s)
1	Scan a blood vessel in 2D-Mode or a phantom simulating a similar CFM effect, then activate CFM to see color.	
2	Press the **Freeze** button.	
3	Press the **Print P1** button.	Evaluate the color print quality. Adjust the *brightness* and/or *contrast* of the Color printer, if required.

4-3-2-4 Wireless USB Network Test

NOTE: When the Wireless Network USB Adaptor is installed in a new system, the functionality is verified as described in Configuring the Wireless Adaptor on page 3 - 100.

NOTE: When the Wireless Network USB Adaptor is installed in a system that is already configured, proceed as described below.

4-3-2-4-1 Wireless USB Network Functionality Test

1.) With the system up and running, press **Config**.

2.) Click **Connectivity** and select **Dataflow** - see Figure 4-10.

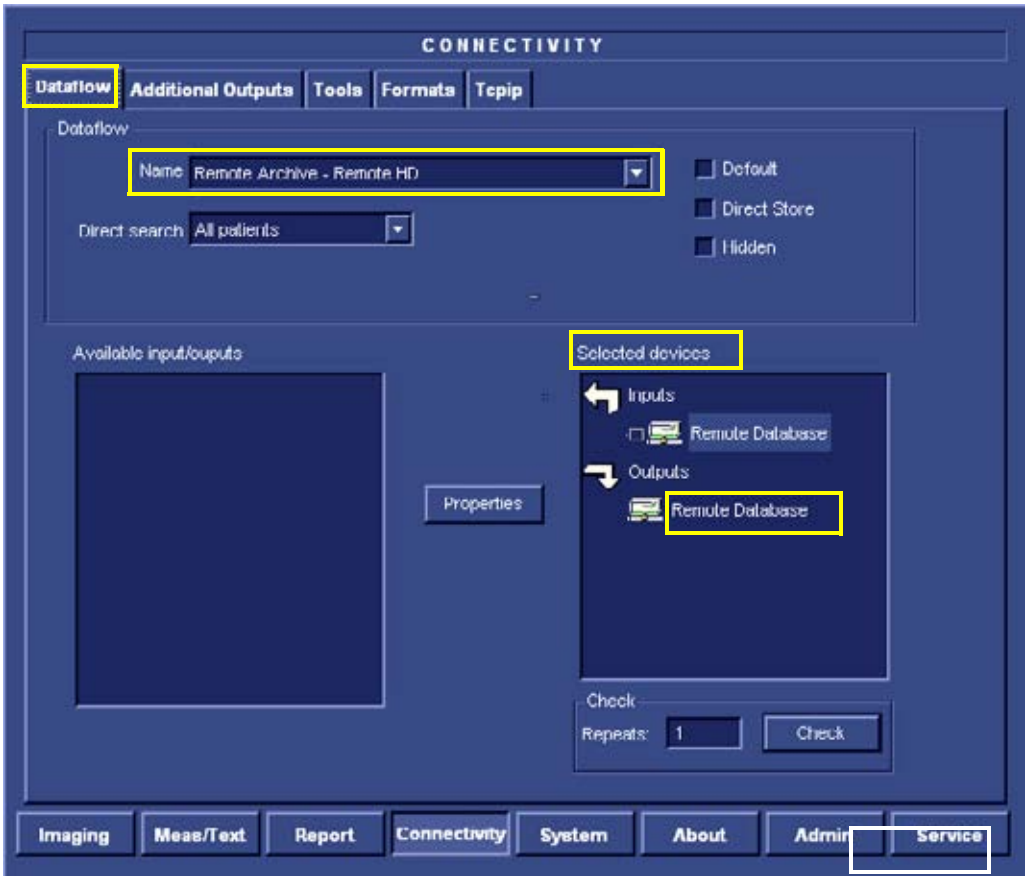


Figure 4-10 Dataflow showing "Remote Database" as the Selected Device

3.) From the Dataflow **Name** field scroll-down list (Figure 4-10), select a dataflow that the user works with in day-to-day operations.

4.) Under **Selected devices** (Figure 4-10), select the appropriate device.

5.) Click **Check**.

The Information - Check Status box opens - Figure 4-11.

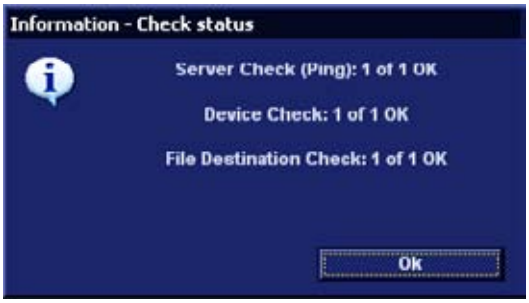


Figure 4-11 Information - Check Status Box

6.) Click **OK**.

The system displays the Dataflow screen indicating that the device check has been successfully performed as indicated by the green confirmation tick - see Figure 4-12.

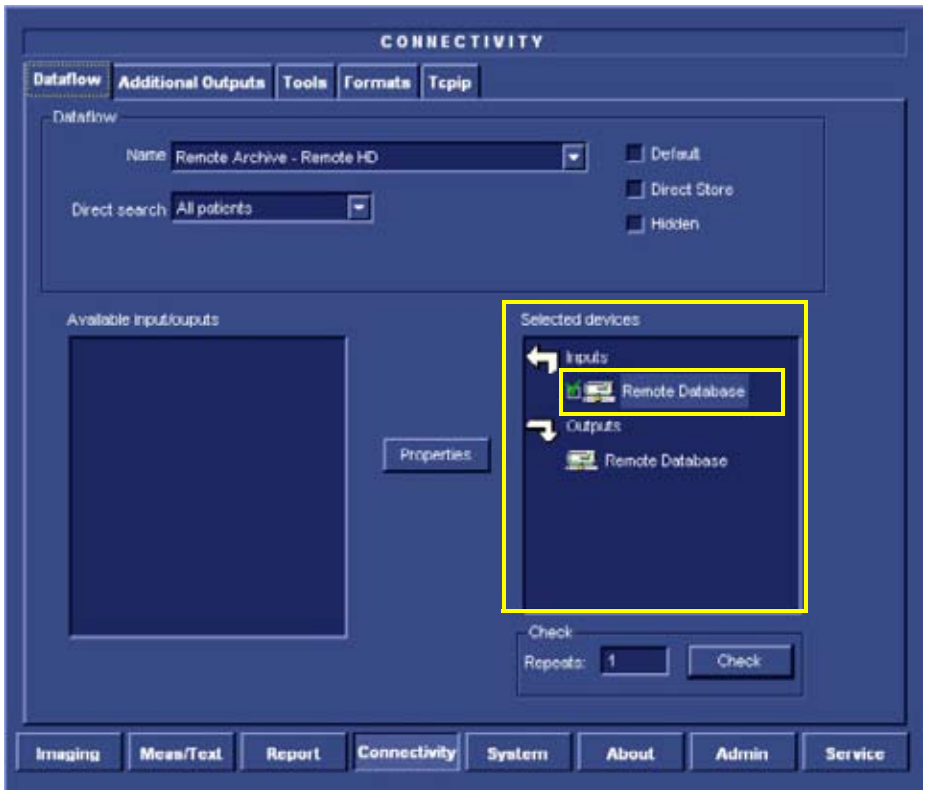


Figure 4-12 Selected Device "Remote Database" showing Successful Check

7.) Under Selected Devices (Figure 4-12), proceed to the next device (in this example "Remote Database" that is under "Outputs"), click **Check** and proceed as before.

8.) Continue this procedure until all selected devices have been verified.

4-3-2-5 External USB Hard Disk Test

NOTE: If the External USB Hard Disk is not currently connected to the system, refer to External USB Hard Disk Installation Procedure on page 8 - 155 for configuration instructions.

Table 4-20 External USB Hard Disk Test

Step	Task	Expected Result(s)
1	Check the External USB Hard Disk status light indicators.	Refer to Figure 8-275 on page 8-250.
2	Create a dummy patient file on the Vivid-i™ or Vivid-q™ scanner. Save several images in the patient file.	
3	Export the images to the External USB Hard Disk.	
4	Delete the dummy patient file (including images) from the Vivid-i™/ Vivid-q™ database.	The deleted patient file and images are no longer listed.
5	Import the dummy patient file and images from the External USB Hard Disk.	The patient file is now listed in the Vivid-i™/ Vivid-q™ database.
6	Open the patient file and check that the images are available for review.	The newly-imported images are displayed correctly on the Vivid-i™/ Vivid-q™ scanner.
7	Delete the dummy patient file (including images) from the Vivid-i™/ Vivid-q™ database.	The deleted patient file and images are no longer listed.

4-3-3 SafeLock Cart Functional Tests

NOTE: In the event that when mounting the Vivid-i™ or Vivid-q™ portable ultrasound scanner on the SafeLock Cart, the unit does not lock firmly in position when inserted into the safelocks (or, if when removing the unit from the Cart, it is difficult to disengage the safelocks), it is necessary to perform the alignment procedure as described in Adjusting the SafeLock Cart Locking Mechanism on page 3 - 73.

4-3-3-1 Main Shelf Movement Test

Table 4-21 Main Shelf Movement Test - Recommended

Step	Task	Expected Result(s)
1	Lift the release handle located on the *left* side of the SafeLock Cart *upwards*.	The locking mechanism of the up and down movement is released, allowing the main shelf to be raised.
2	While lifting the release handle, raise the shelf upwards and make sure it is able to reach its maximum height.	Ensure that you do not apply too much force to move the main shelf and that the shelf movement is smooth.
3	Press the release handle down, while pushing the main shelf back *downwards* to return it to its lowest position.	The main shelf returns to its lowest position.

4-3-3-2 Brakes Function Test

Table 4-22 Brakes Function Test (Front Castor Wheels) - Recommended

Step	Task	Expected Result(s)
1	Release the wheel lock (upper lever) on each front castor wheel by pulling it *upwards*. Push and pull the unit right, left, backwards and forwards.	Ensure that the wheels move freely in all directions. Check the wheels for wear and tear, and replace if necessary.
2	Press the foot brake (lower lever) *down* on each front castor wheel to lock the wheels in position. Push and pull the unit right, left, backwards and forwards.	Ensure that the wheels are locked and there is no movement in any direction.

4-3-3-3 SafeLock Cart USB Test

Table 4-23 SafeLock Cart USB Functional Test - Recommended

Step	Task	Expected Result(s)
1	Plug the service dongle (Technical Support plug) into one of the USB ports on the SafeLock Cart.	
2	Switch ON power to the SafeLock Cart.	
3	With the Vivid-i™/ Vivid-q™ scanner mounted into position on the cart, switch ON power to the scanner.	The red LED on the service dongle illuminates.
4	Move the service dongle between each of the four USB ports in turn, checking that the LED illuminates correctly.	The red LED on the service dongle illuminates.

4-3-4 Back End Processor Tests

4-3-4-1 Phono Test (optional)

Table 4-24 Phono Test - Recommended

Step	Task	Expected Result(s)
1	Connect the microphone to the microphone input on the ECG Board. Note that the special Medical Microphone is required.	
2	Use your finger to click (tap) the microphone.	Verify that the waveform on the screen corresponds to the microphone clicks.

4-3-4-2 Magneto Optical Drive (MOD) Test

Table 4-25 MOD Test - Recommended

Step	Task	Expected Result(s)
1	Restart the system performing a full shutdown and bootup, as described in Power ON/Boot-up on page 4 - 4.	During the boot-up process, verify that the messages **SCSI Adaptor Installation 2271149-2INS** and **MO** are displayed.
2	Insert a new MO Media Sony EDM-2300B (2.3G) into the MOD.	
3	Press **Ctrl+F11** (or **Alt+D**) on the keyboard and select <Back End>, <Media Driver> and <MO>, as appropriate.	**The UtilMediaApp** dialog box is displayed.
4	Select the **IsMediaAcces** button.	The message **Media in drive G is accessible** is displayed.
5	Select the **EjectMO** button.	The message **Media is outside** is displayed. Check that the media has actually been ejected.
6	Select the **LoadMO** button.	The message **Media is inside** is displayed. Check that the media is actually inside.
7	Select the **Format** button.	The message **Media in drive G was formatted successfully** is displayed.
8	Select the **GetVolInfo** button.	The message **Media in drive G has following properties: Media Label = MY_LABEL, Media File-System Name = FAT** is displayed.
9	Select the **Get BTPsector** button.	The message **The Bytes Per Sector value of media in drive G is 512** is displayed.
10	Select the **SetVolLabel1** button.	The message **Media Label set to TEST_LABEL1** is displayed.
11	Select the **GetVolInfo** button.	The message **Media in drive G has following properties: Media Label = TEST_LABEL, Media File-System Name = FAT** is displayed.
12	Select the **Exit** button and close the Diagnostic Application.	
13	Press the **Archive** button on the keyboard.	The *Patient List* window is displayed.
14	Press the **Utilities** button on the soft menu.	The *General Status* window is displayed.
15	Press the **Removable Media Utility** button.	The *Utility* window is displayed, showing the message: **Free space on Media: 1096 MB**.
16	Type the new label (for example, "Side1"), then select the **Format** button. Confirm "YES" to the warning message.	The message **Current Media Name is:SIDE1. Media was formatted successfully** is displayed. MO Label: SIDE1, MO STATUS: MOUNTED
17	Select the **Eject** button.	The message **Media Ejected** is displayed. MO STATUS: Ejected.
18	Select the **OK** button to exit the utility.	

4-3-4-3 DVD/CD Writer Test

Table 4-26 DVD/CD Writer Test - Recommended

Step	Task	Expected Result(s)
1	Connect the DVD to the power and to the system (see DVD/CD-RW Drive on page 3 - 28). Connect a probe to the system and power ON the system.	System and DVD connected.
2	Create a new patient for this test. **Note**: The term "***Test Patient***" refers to the newly created patient.	The system scan and the name of the "***Test Patient***" is displayed in the top-left corner of the screen.
3	Holding the probe in the air, press the **Record** button to start scanning. Continue recording until approximately 20MB of data is acquired.	The progress bar indicates "full with images or movies".
4	Press **<Patient>** button and then select **End Exam** from the archive menu.	The following message is displayed: **Unsaved image(s). Which do you want to save?**
5	Select **All**.	A progress-bar is displayed showing that the images are being archived.
6	Press **<Patient>** button and then select **Patients List** from the archive menu.	The **Search/Create Patient** window is displayed.
7	Select ***Test Patient*** and press **Export**.	The **Export** pop-up is displayed.
8	Place a blank DVD media into the DVD/CD device. **Note**: For information on types of media, see DVD/CD-RW Drive on page 3 - 28.	
9	Select **To: CD/DVD Archive** and press **OK.**	A pop-up is displayed with the message: **Current media is not formatted. Do you wish to format it?**
10	Change the label to **TEST-1** and press **OK**.	A progress bar is displayed.
11	Press **Select All** and then press **Copy**.	Copying begins and the progress bar displays copying status. At the end, a message confirms the number of items copied. Details are displayed in the Status field.
12	Press **OK** to close the message and then press **Done**.	A progress bar and message are displayed asking you to wait.
13	Press **Alt+E** and select **CD/DVD Writable (H:\)** from the menu.	The message **Media Ejected** is displayed.
14	Remove the DVD from the drive.	
15	Delete the ***Test Patient*** that was added for the purpose of this test.	The ***Test Patient*** is removed from the patient list.
16	Place the media into the drive and press the **Import**.	The Export pop-up is displayed.
17	Select **CD/DVD Archive** on the **From:** list and press **OK**.	The following dialog is displayed: **IMPORT PATIENT - CD/DVD Archive**
18	Press **Select All** and then press **Copy**	Copying begins and the progress bar displays copying status. At the end, a message confirms the number of items copied. Details are displayed in the Status field.

Table 4-26 DVD/CD Writer Test (cont'd) - Recommended

Step	Task	Expected Result(s)
18	Press **OK** to close the message and then press **Done**.	A progress bar and message are displayed asking you to wait.
19	Press **Alt+E** and select **CD/DVD Writable (H:\)** from the menu.	The message **Media Ejected** is displayed.
20	Remove the DVD from the drive.	
21	Verify that all of the saved exams and images of the ***Test Patient*** exist in the database.	The exams and images that were exported and imported for the ***Test Patient*** should appear in the database.
22	Select the **Test Patient** exams and press **Delete**.	A message is displayed prompting the user to confirm the delete command.
23	Press **OK** to confirm delete (must confirm three times).	The ***Test Patient*** is deleted from patient list.

4-3-4-4 Plug and Scan Test

Table 4-27 Plug and Scan Test - Recommended

	Task	Expected Result(s)
1	Press the **On/Off** button on the control console for no more than 3 seconds.	The system enters *Standby* mode.
2	Turn OFF the system's circuit breaker.	The system remains in *Standby* mode, indicated by the blinking **On/Off** button LED.
3	Turn ON the system's circuit breaker. Press the **On/Off** Button.	The system returns quickly to the *Power-ON* state -less than 30 seconds.
4	Turn OFF the system's circuit breaker. Turn ON the system's circuit breaker after entering to Standby mode.	The system enters *Standby* mode and stays in this mode. The **On/Off** button LED is blinking.
5	Turn OFF the system's circuit breaker. Press the **On/Off** button.	The system enters the *Power-OFF* state. The **On/Off** button LED is OFF.

Section 4-4
System Turnover Checklist

Before returning the Vivid-i™/ Vivid-q™ ultrasound scanner to regular operational use, the System Configuration settings should be checked. In 2D-Mode, press **Config** on the keyboard and check the settings in accordance with those listed or referenced in Table 4-28 below

4-4-1 Software Configuration Checks

Table 4-28 Software Configuration Checklist

Step	Task	Check
1	Check the date and time settings. Refer to Date and Time Adjustments on page 3 - 77.	
2	Check the language settings.Refer to Language Selection on page 3 - 78.	
3	Ensure that all of the software options are configured correctly. Refer to Software Options Configuration on page 3 - 90.	
4	Ensure that the hospital details are configured correctly. Refer to Table 3-5 on page 3-76.	
5	Ensure that the VCR is configured as required for the specific site and country. Refer to video converter setup - see Figure 3-50 on page 3-53.	
6	Ensure that the measurement units are configured as required for the specific site and country.Refer to Units of Measure on page 3 - 80.	
7	Ensure that the connectivity network settings have not been modified and are configured as required for the specific site. Refer to Set the Scanner's Network Information on page 3 - 106.	

Section 4-5
Site Log

Table 4-1: Vivid-i™/ Vivid-q™ Site Log

Date	Service Person	Problem	Comments

Table 4-1: Vivid-i™/ Vivid-q™ Site Log (cont'd)

Date	Service Person	Problem	Comments

Chapter 5
Components and Function (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains concepts, component arrangement, and sub-system functions for both the Vivid-i™ and Vivid-q™ systems. It also describes the power distribution system and probes.

Table 5-1 Contents in Chapter 5

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Section 5-2
General Information

The Vivid-i™/ Vivid-q™ system is an ultra-light handheld ultrasound scanner that can be used with both phased, linear and curved array ultrasound probes and Doppler (Pedof) probes.

Weighing only 5 kg (11 lb), each system is extremely versatile and - depending upon the installed software - can be used for various imaging modes, such as:

- 2D Gray Scale and 2D Color Flow imaging
- M-Mode Gray Scale imaging
- Color M-Mode
- Doppler
- Different combinations of the above modes

5-2-1 Introduction

Operator Panel
ECG Connector
Pencil Probe Connector
RS Probe Connector
2 x USB Ports
(not visible in illustration - recommended for
connection of USB storage devices e.g. Memory Stick)

Figure 5-1 Front and Side View of the Vivid-i™/ Vivid-q™System

The Vivid-i™ and Vivid-q™ systems are equipped with a highly efficient power supply, resulting in low power consumption and minimal acoustical noise. Among other significant features are the following:

- Integrated, low-power Front End (uses advanced ASIC and FGPA technologies).
- Open connectivity using multiple USB ports
- High-performance 15" LCD monitor
- Low profile, backlit keyboard

Vivid-i™ and Vivid-q™ systems have a digital beam forming system (incorporated in the Front End) that can handle up to 192 element linear probes using multiplexing.

Signals flow from the Probe Connector Panel, to the Front End (FE) Electronics, to the Back End Processor (BEP), and finally are displayed on the monitor and peripherals.

In addition, the Vivid-i™ and Vivid-q™ systems enable acquisition of the following signals: ECG, and external ECG. The ECG module, which supports acquisition of three bipolar ECG channels (leads I, II, III), is incorporated in the cabinet cage assembly to provide ECG signals to synchronize cardiac ultrasound image acquisition. Additionally, other analog inputs from devices such as treadmills are processed.

5-2-2 Signal Flow

The two TR32 Boards in the Front-End Processor generate the strong bursts transmitted by the probes as ultrasound into the body. The Transmit bursts are routed from the TR32 Boards via the Probe and MUX Board (P&M), to the ultrasound probe located on the board.

Weak ultrasound echoes from blood cells and body structure are received by the probes and routed via the Probe & MUX Board back to the TR32 Boards. The TR32 Boards amplify these signals, convert them to a digital signal and do the beam forming.

The vector data streams (one per each MLA) generated by the Beam Former are routed to the RFI Board for further processing by the Demodulator FPGA and DSP and then the signals are transferred via the PCI bus to the Back-End Processor where they are converted to video. The video signals are routed to the internal LCD monitor and to the VGA connector located on the back panel for connection of external monitor or VCR (via special adaptor).

5-2-2-1 System Configuration and Software

System configuration is stored on a hard disk drive inside the Back-End Processor.

At power up, all necessary software is loaded from the hard disk.

5-2-2-2 Operator Panel

The user initiates system operations via the Operator Panel that has ultrasound-specific buttons, mode-dependent softkey buttons and an alphanumeric keyboard.

5-2-2-3 Electronics

Vivid-i™ and Vivid-q™ internal electronics are divided into three main components:

- Front End (FE) Processor
- Back End Processor (BEP)
- DC/DC Power Supply (DC/DC PS)

For both Vivid-i™ and Vivid-q™ systems, internal electronics comprise a single card cage that contains both the FEP and the BEP. The interconnecting signals between the two sections are routed internally via a flex board. The power lines from the DC/DC PS are routed internally via two cables, to the BEP and FEP. The video signals are routed from the BEP to the LCD via a flex cable. The interconnection to the operator keyboard is via a dedicated cable. An additional flex connects the ECG module to one of the USB ports located on the keyboard.

The main functional blocks in the Vivid-i™ and Vivid-q™ systems are listed below, and described in detail in this chapter, as follows:

- Front End (FE) Processor - see *Front End Unit* on page 5-6
- Back End Processor (BEP) - see *Back End Processor* on page 5-21
- Internal and external cable interconnections - see *External Input/Output (I/O)* on page 5-29
- Monitor & Keyboard - see *Monitor and Operator Panel* on page 5-34
- Power Supply System - see *Power Supply System* on page 5-30
- Peripherals - see *Peripherals* on page 5-46

For a detailed block diagram of the Vivid-i™/ Vivid-q™ system, refer to Figure 5-2 on page 5-5.

5-2-3 Vivid-i™ and Vivid-q™ Systems - Block Diagram

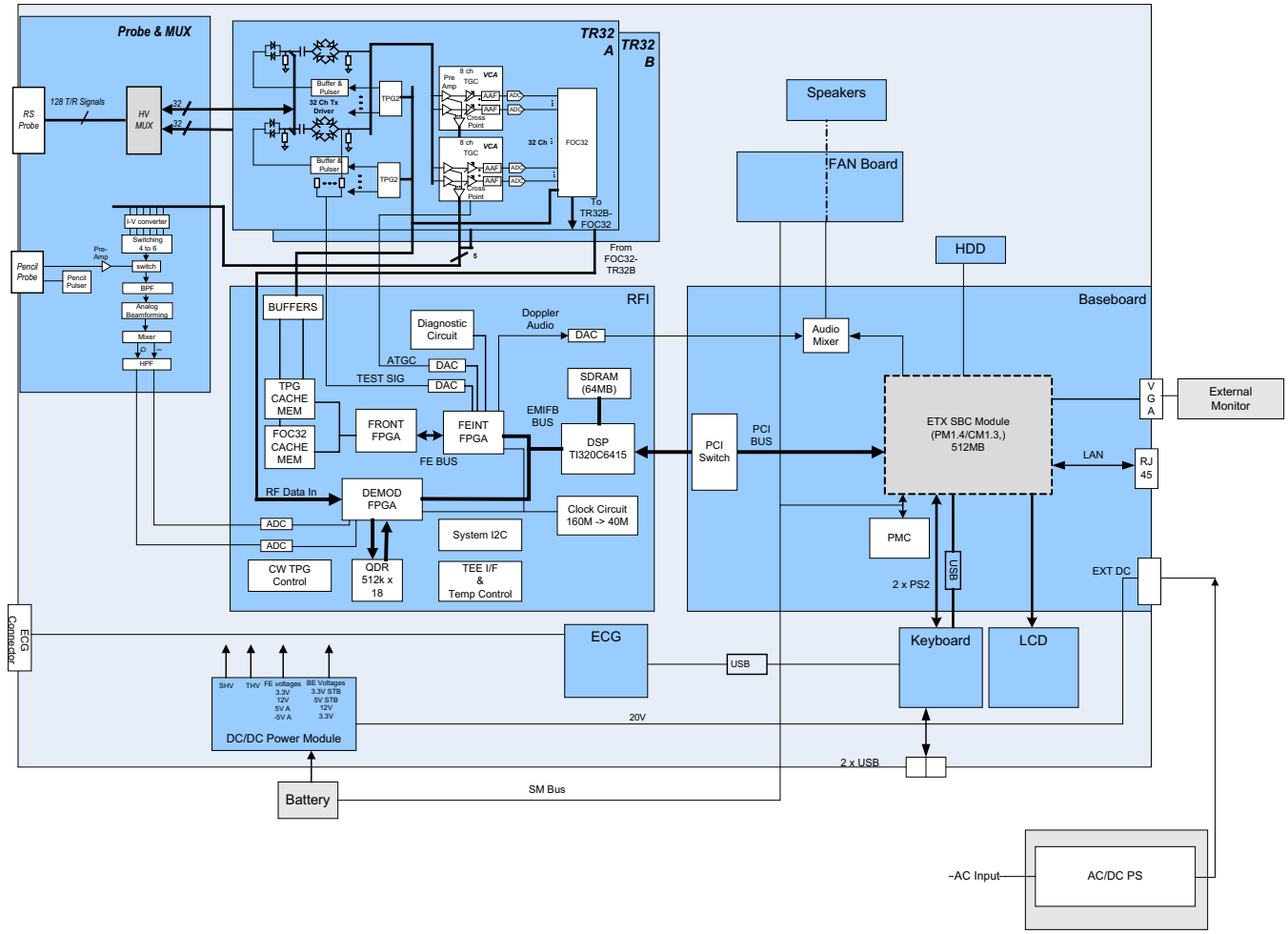


Figure 5-2 Vivid-i™/ Vivid-q™ System Block Diagram

Section 5-3
Front End Unit

5-3-1 General Information

The Vivid-i™/ Vivid-q™ Front End system (see diagram in Figure 5-4 on page 5-8) is divided into two subsystems:

1.) Scanner Subsystem

Consists of the RFI Board (Scan Controller and tissue processing).
For a detailed description, see *RFI Board* on page 5-11.

2.) Front End Subsystem

Includes the following:

- Two TR32 Boards (each board includes a 32-channel digital Beamformer)
  For a detailed description, see *TR32 Boards (Transmitter/Receiver)* on page 5-15.
- P&M (Probe & MUX Board) - includes CW BF & HVMUX
  For a detailed description, see Probe and MUX (P&M) Board on page 5 - 18.

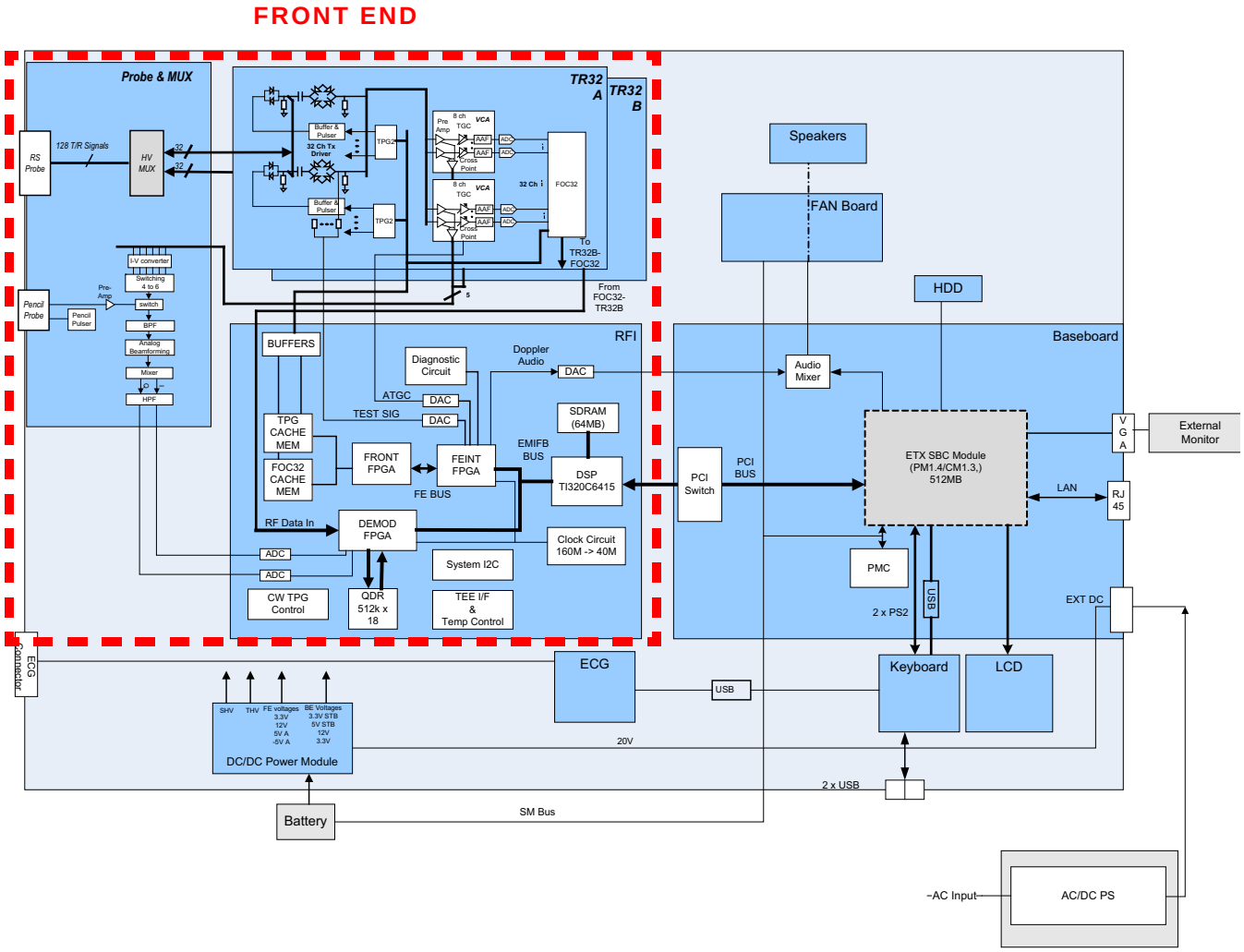


Figure 5-3 Vivid-i™/ Vivid-q™ System Block Diagram showing Location of Front End

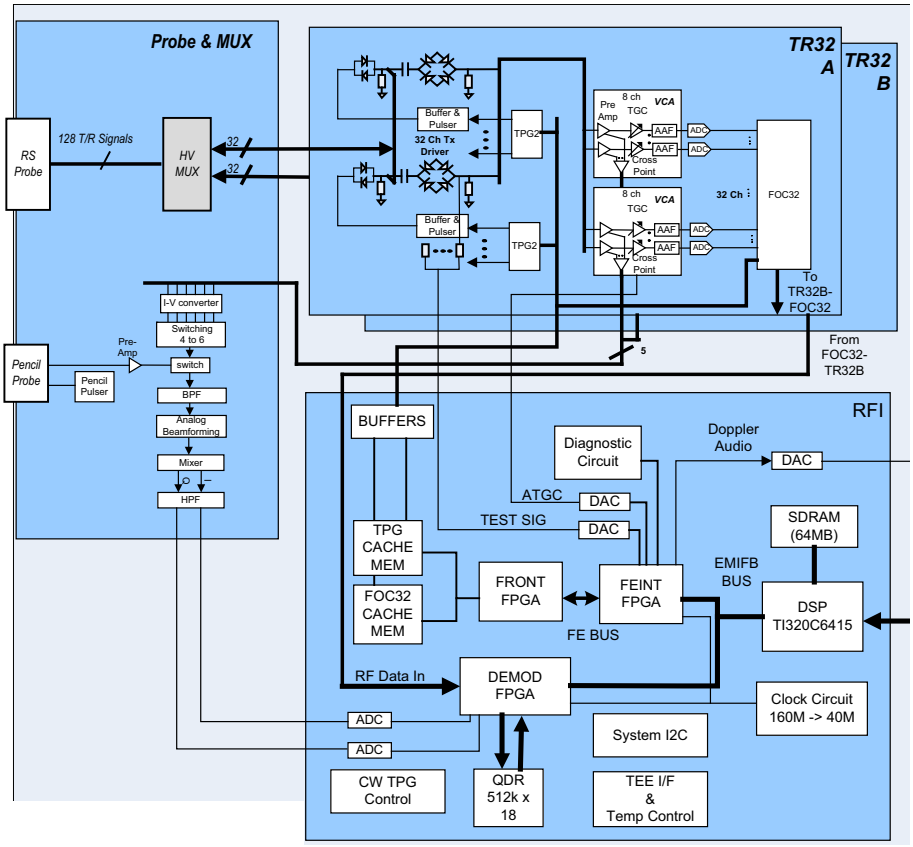


Figure 5-4 Front End - Block Diagram

5-3-2 Front End Unit - Location in the System

The Front End unit is located in the Bottom assembly, on the *right* side, as shown in Figure 5-5.

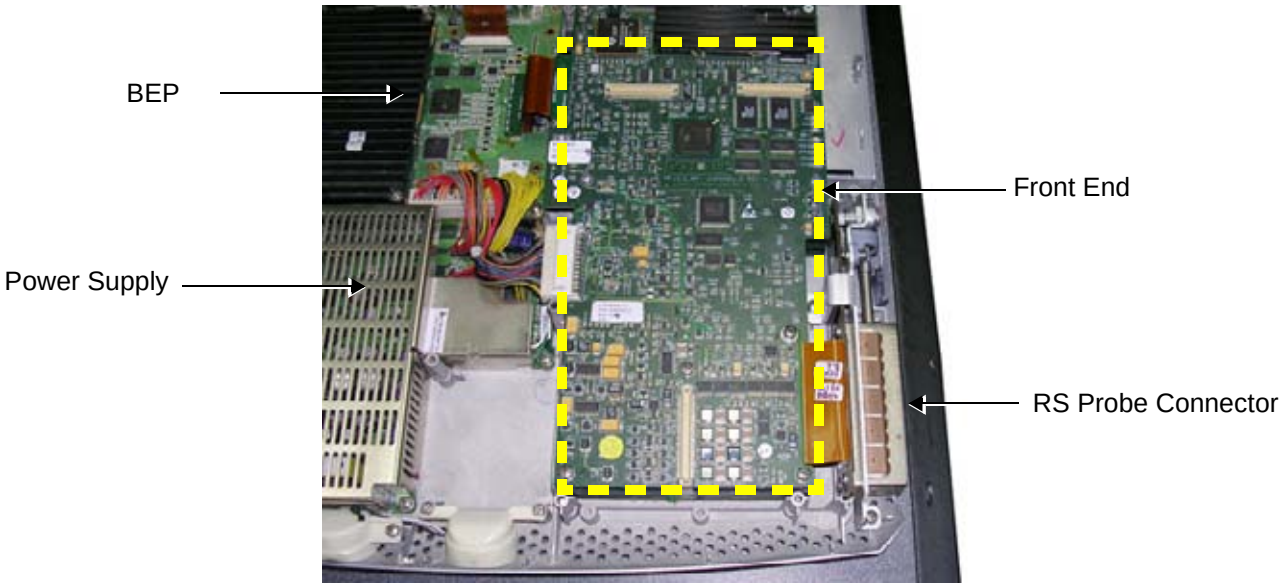


Figure 5-5 Bottom Assembly showing Location of Front End

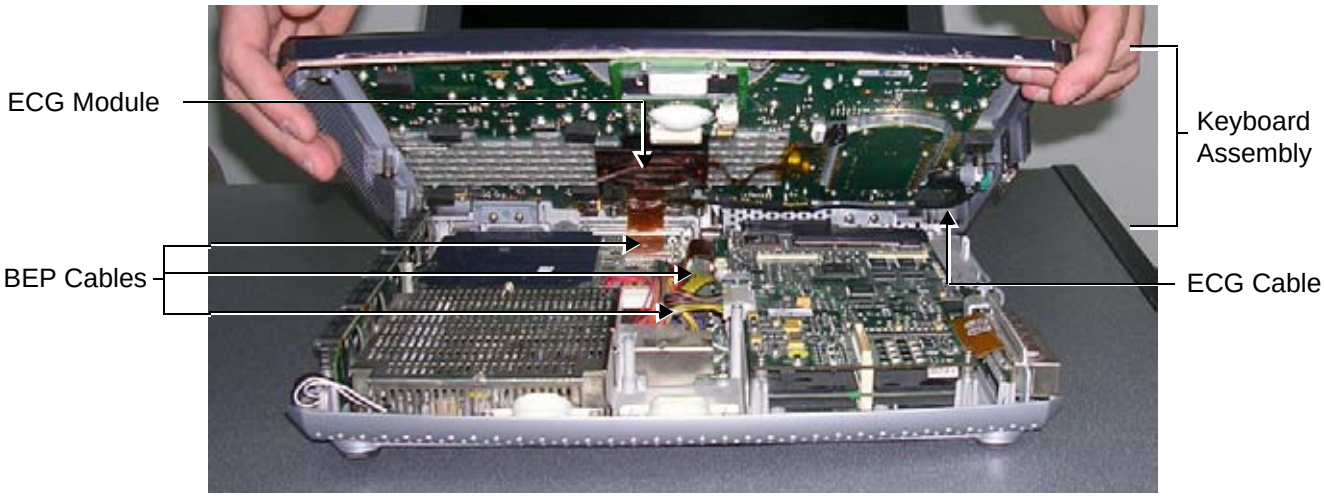


Figure 5-6 Keyboard Assembly in Opened Position

WARNING: When opening and closing the Keyboard Assembly, take care not to damage the cables connected to the BEP (indicated in Figure 5-6, above).

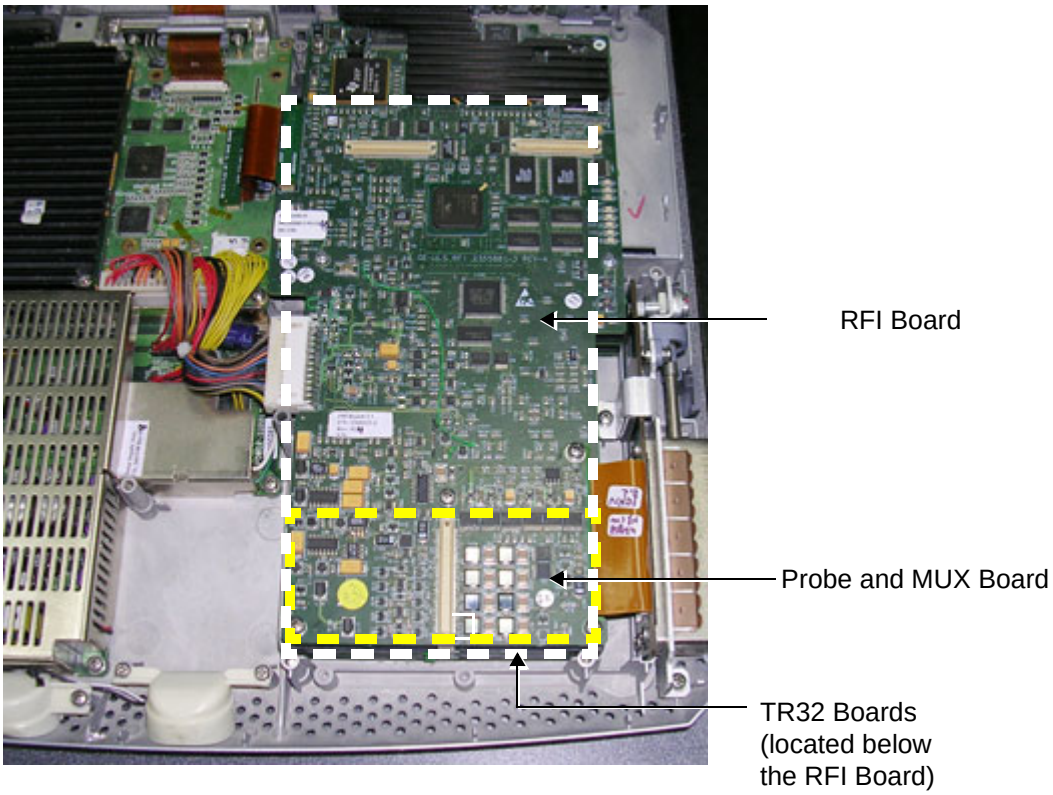


Figure 5-7 Bottom Assembly showing Position of Boards (RFI,TR32, P&M)

5-3-3 RFI Board

The RFI Board combines the following functionalities:

- Front End Control
- Radio Frequency & Tissue Processing
- PCI Bus Interface

5-3-3-1 Tasks Performed by the RFI Board

- System Master Clock generator
- Transmitter Control
- ATGC Control
- Receive Focusing Control
- Analog Test Signal Generator
- Tx voltage Enable/Disable
- Probe Sensing
- Control of TR32 and P&M Boards
- Ultrasound data acquisition and processing

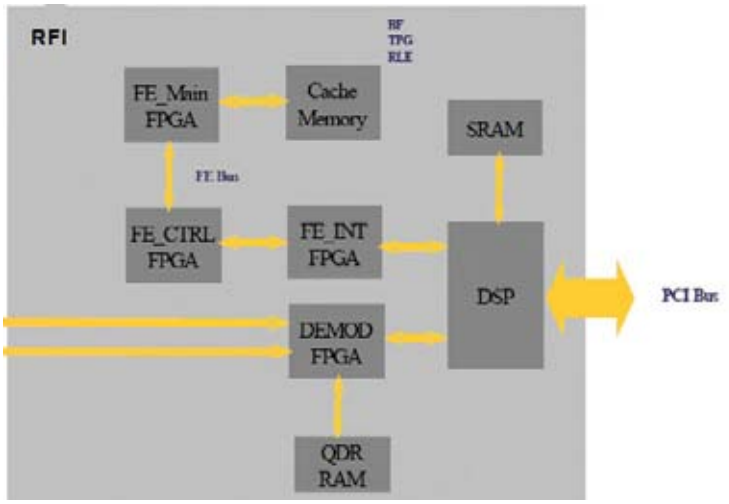


Figure 5-8 RFI Block Diagram

5-3-3-2 Watchdog and Power ON Reset

For safety reasons, a HW watchdog stops ultrasound transmit and resets the DSP if the DSP stops toggling the watchdog inputs.

Once enabled, it is not possible to disable the watchdog unless the board is reset, or power is cycled.

5-3-3-3 Boot-up of DSP and Firmware

When the power is turned ON, the DSP is reset, and all FPGAs are blank. The DSP is connected to PCI directly, and can only boot up with help from the Host.

5-3-3-4 FPGA Download

The FPGAs contain no configuration upon power-ON; FGPA Download proceeds as follows:

1.) The actual FPGA contents (bit-streams) are written into DSP memory from the Host.
2.) The DSP configures serial port 0 to aid configuration.
3.) The DSP writes the bit-streams to serial port 0.
4.) The DSP verifies that the FPGAs are configured correctly.

5-3-3-5 PCI Connection

The RFI Board interfaces directly to the PCI bus via the DSP PCI to the local bus bridge.

5-3-3-6 RFI Board Connectors

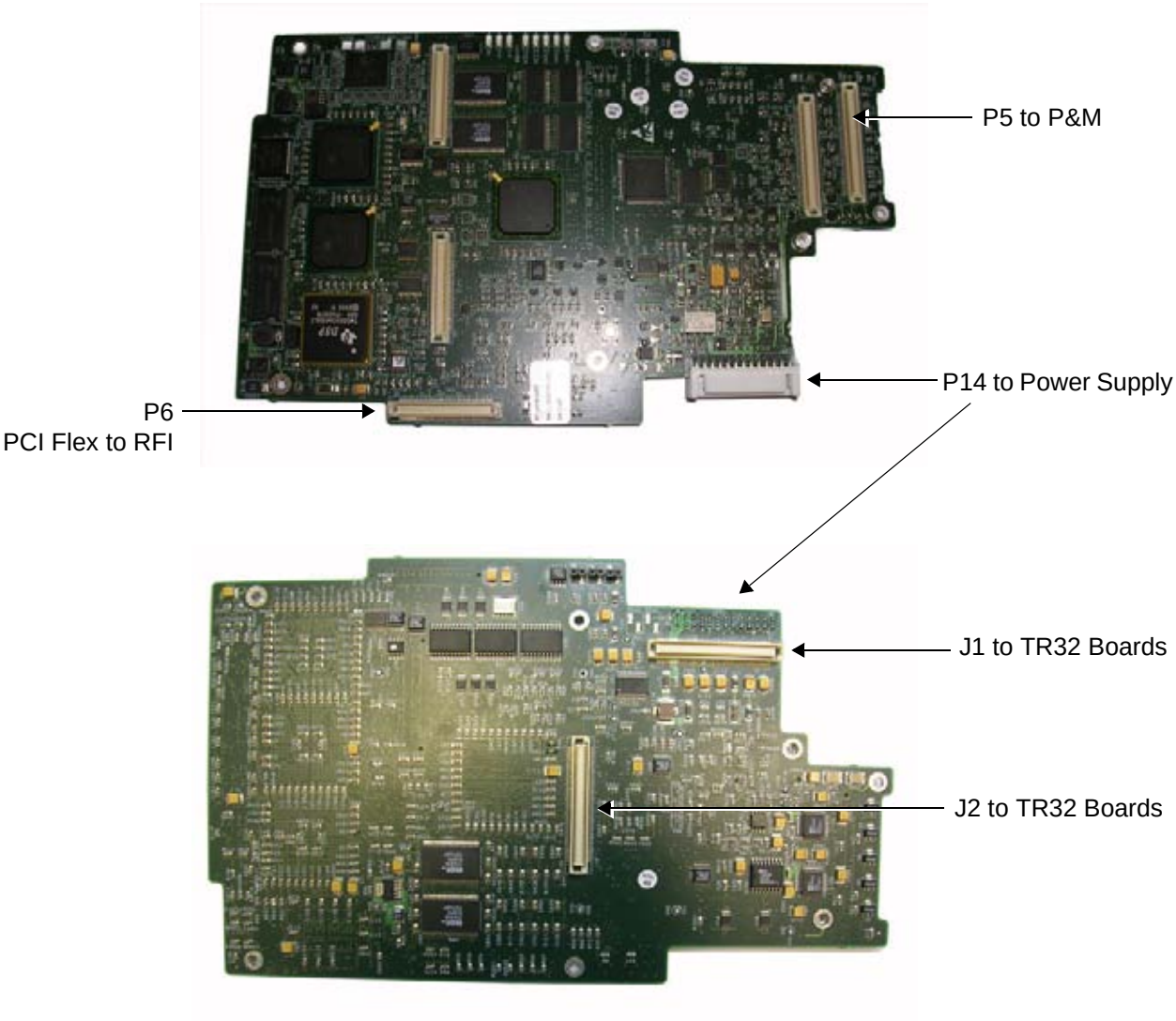


Figure 5-9 RFI Board Connector Locations

Table 5-2 RFI Board Connectors

Connector #	Description
P5	To P&M
P6	PCI Flex to RFI
P14	To power supply
J1	To TR32 Boards
J2	To TR32 Boards

Table 5-3 RFI Board - Input DC Voltages

Input	Description	Connector - PIN#	Connected From
+3.3 V	DC voltage from PS	P14 1-4	From PS
HVP_IN	Fixed DC high voltage +80 V	P14-9	From PS
HVN_IN	Fixed DC high voltage -80 V	P14-11	From PS
+THV	Transmit high voltage varies from 0 to +50 V	P14-12	From PS
-THV	Transmit high voltage varies from 0 to -50 V	P14-14	From PS
+5 V_IN	DC voltage from PS	P14-16	From PS
-5 V_IN	DC voltage from PS	P14-20	From PS
+12 V_IN	DC voltage from PS	P14-18	From PS
1.8 V	DC voltage from PS	P1421, 22	From PS

5-3-3-7 Probe Management

5-3-3-7-1 Mechanism

The RFI Board performs the following probe management functions:

- Controls the selection of a probe connector
- Senses the Probe *type*
- Senses the Scan Plane Angle on TE probes
- Senses the Probe *temperature*
- If the temperature exceeds the *maximum* temperature, the RFI stops scanning and disables Tx voltage.

  The temperature references are set to 41.3 ^{o}C and 43.0 ^{o}C
- If the temperature reading falls below *minimum* temperature, the RFI stops scanning and disables Tx voltage.

  The minimum temperature references are set to 15 ^{o}C. A temperature reading as low as 15 ^{o}C indicates a probe temperature-sensing error.

5-3-4 TR32 Boards (Transmitter/Receiver)

5-3-4-1 General Description

The TR32 has 64 receive channels and is made up of two identical TR32 Boards: *TR32A* and *TR32B* (see Figure 5-10). Each TR32 Board is a complete 32-channel ultrasound Front End that includes the following features and functions:

- 32 Transmitters
- 32 receiving channels, T/R switch, Pre-Amp, TGC
- 32 channel Beam Former
- First stage of Analog Beam-Former for CW mode, included in the receive input ASIC
- Clock distribution, starting with input at PECL level

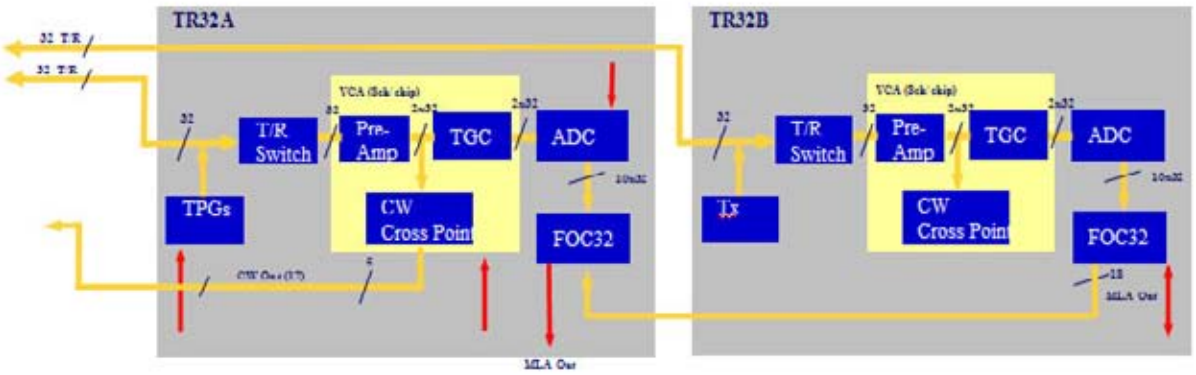


Figure 5-10 TR32 Board Block Diagram

Figure 5-11 Connectors on TR32 Board - Upper View

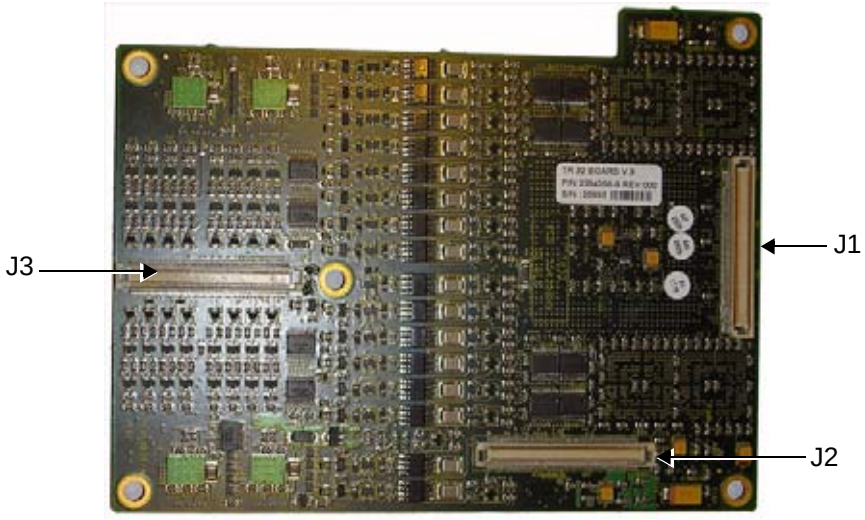


Figure 5-12 Connectors on TR32 Board - Bottom View

Table 5-4 TR32 Board Connectors

Connector #	Description
P1	To RFI Board
P2	To RFI Board
P3	To P&M Board
J1	To lower TR32 Board
J2	To lower TR32 Board
J3	To lower TR32 Board

Table 5-5 TR32 Board - Input DC Voltages

Input	Description	Connector PIN#	Connected From
5 VA	DC voltage, distributed via RFI Board "A" indicates analog circuit	J2-80, 81, 82	RFI
1.8 V	DC voltage, distributed via RFI Board	J2 85-96	RFI
3.3 V	DC voltage, distributed via RFI Board	J2 97-110	RFI
-5 VA	DC voltage, distributed via RFI Board. "A" indicates analog circuit	J2 78 79	RFI
TXPSP (High voltage positive)	Transmit high voltage varies from +2.5 to +50 V distributed via RFI Board	J2 69,71,73	RFI
TXPSN (High voltage negative)	Transmit high voltage varies from -2.5 to -50 V distributed via RFI Board	J2 70, 72, 74	RFI

Each TR32 Board has 32 channels and includes a 32-channel Digital Beam Former (consisting of one FOC32 ASIC).

Inputs are 32 probe lines that have gone through aperture selection, performed in the P&M Board. Outputs are MLA0 and MLA1 digital buses from the Beam Former and CW output lines to the Analog CW BF.

The MLA output bus of TR32B is connected to the MLA input bus of TR32A, giving a 64-channel BF on the MLA output.

All required control, memory and clocks for the two TR32 Boards reside in the RFI Board.

The two TR32 Boards are linked together in parallel. The way in which they operate depends upon the probe currently in use, and also on the current type of Transmit/Receive mode.

Transmit/Receive modes can be divided into two types, as shown in the following examples:

- CW Mode - half the channels *transmit* signals, and half the channels *receive* signals, simultaneously.
- 2D Mode - signals are propagated between the channels; there is a specific time delay between *transmit* and *receive* - data is then interpolated in accordance with the delay, and the image is created.

The TR32 Boards are connected to the RFI Board by stacked connectors, as shown Figure 5-13 below.

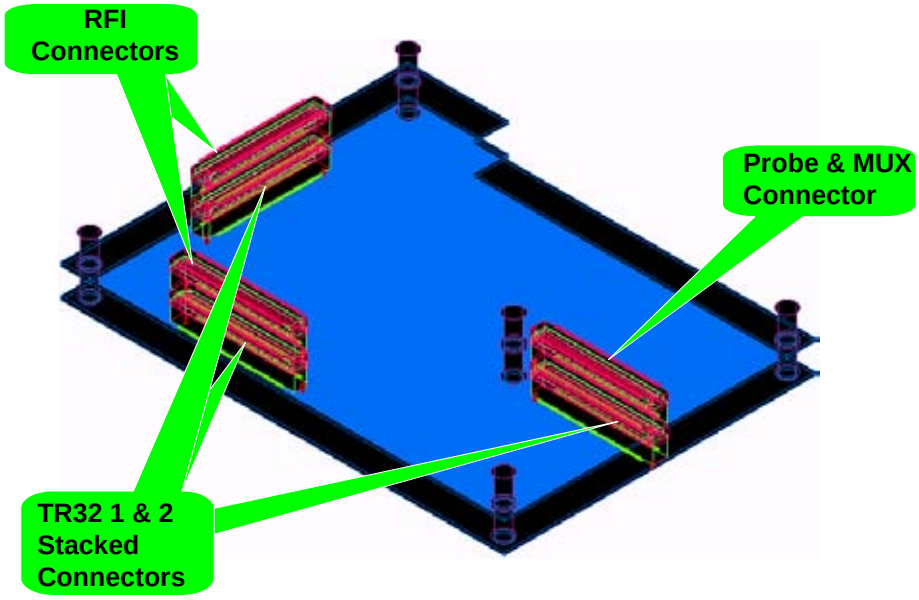


Figure 5-13 TR32 Board - Stacked Connectors

5-3-5 Probe and MUX (P&M) Board

The Probe and MUX (multiplexer) Board enables acquisition and processing of signals from and to probes connected to the front panel. The P&M enables up to 64 receive/transmit channels, and performs the following functions:

- Receiving the channels and connecting them to the TR32 Boards
- Probe connectors
- High voltage MUX that selects 64 out of 128 inputs, routed to the TR32 boards
- Pencil's probe Pulser and receive pre-amplifier
- Analog Doppler processor: a signal path for CW mode containing analog Beam Former, Band Pass filter, I/Q base band converter, high pass filter.

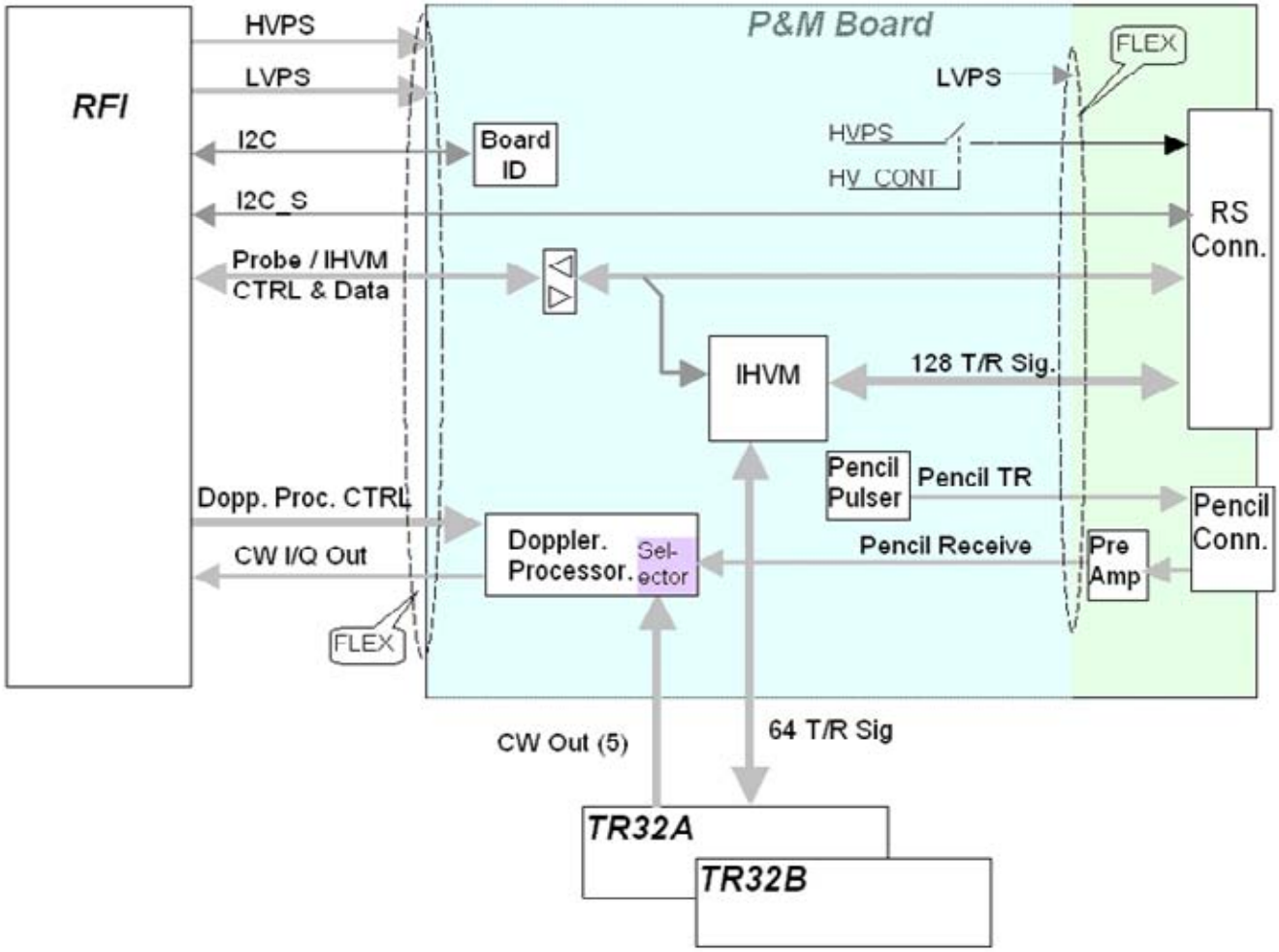


Figure 5-14 Probe and MUX Board - Block Diagram

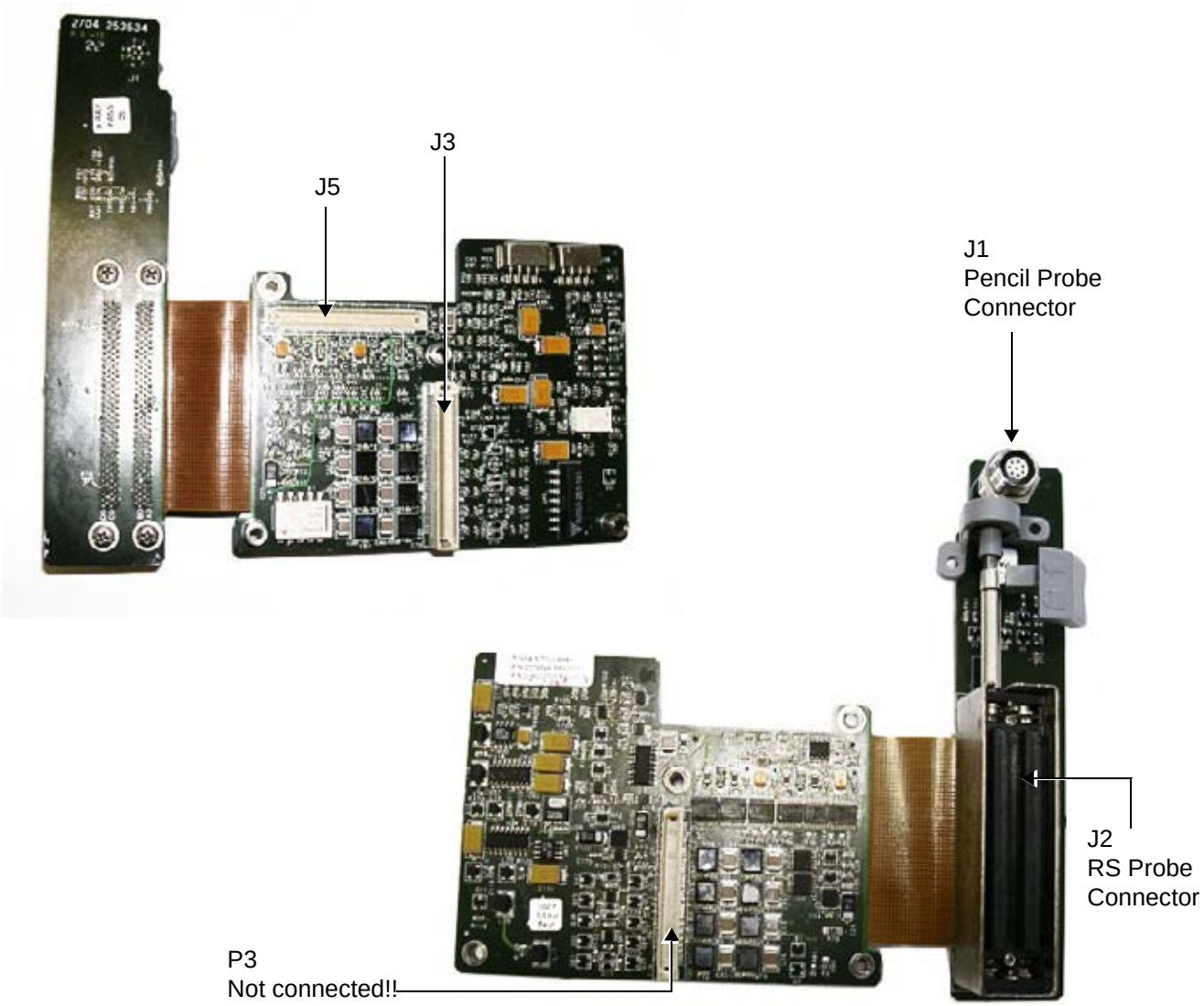


Figure 5-15 Probe and MUX Board Connector Locations

Table 5-6 Probe and MUX Board Connectors

Connector #	Description
J1	Pencil Probe Connector
J2	RS Probe Connector
J3	To Upper TR32 Board
J5	To RFI Board

Table 5-7 P & M Board Input DC Voltages

Input	Description	Connector - PIN#	Connected From
12 V	DC voltage, distributed in P&M Board	J5-16..21	RFI Board
3.3 V	DC voltage, distributed in P&M Board	J5-5..8	RFI Board
-5 VA	DC voltage, distributed in P&M Board "A" indicates analog circuit	J5-13..15	RFI Board
5 VA	DC voltage "A" indicates analog circuit	J5-9..12	RFI Board
HVPSP	Transmit high voltage varies from +2.5 to +50 V	J5-2	RFI Board
HVPSN	Transmit high voltage varies from -2.5 to -50 V	J5-1	RFI Board

Section 5-4
Back End Processor

5-4-1 Introduction

The Back End Processor (BEP) supports the operation of the Vivid-i™/ Vivid-q™ ultrasound unit and is the main controller for the system.

A block diagram of the BEP is provided in Figure 5-17 on page 5-22.

The various components that comprise the Vivid-i™/ Vivid-q™ BEP are described in the following sections:

- ETX SBC Central Processing Unit (CPU) on page 5 - 23.
- ETX Base Board on page 5 - 23.
- Hard Disk on page 5 - 25.
- Fan Control on page 5 - 25
- RTC (BIOS) Battery on page 5 - 25
- Back End Processor - Location of Components on page 5 - 26

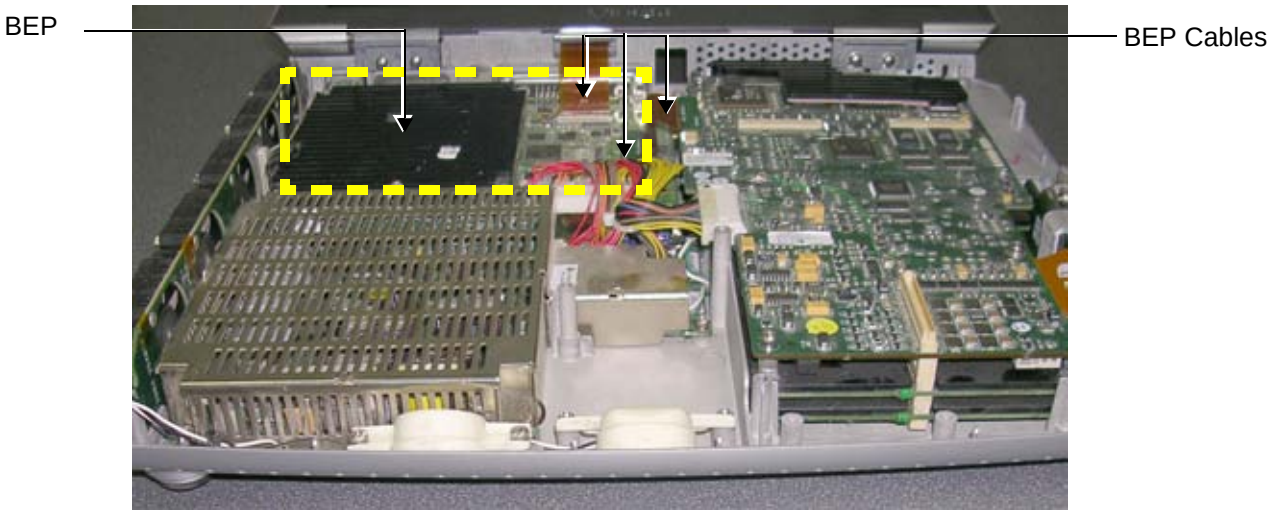


Figure 5-16 Location of BEP in Bottom Assembly

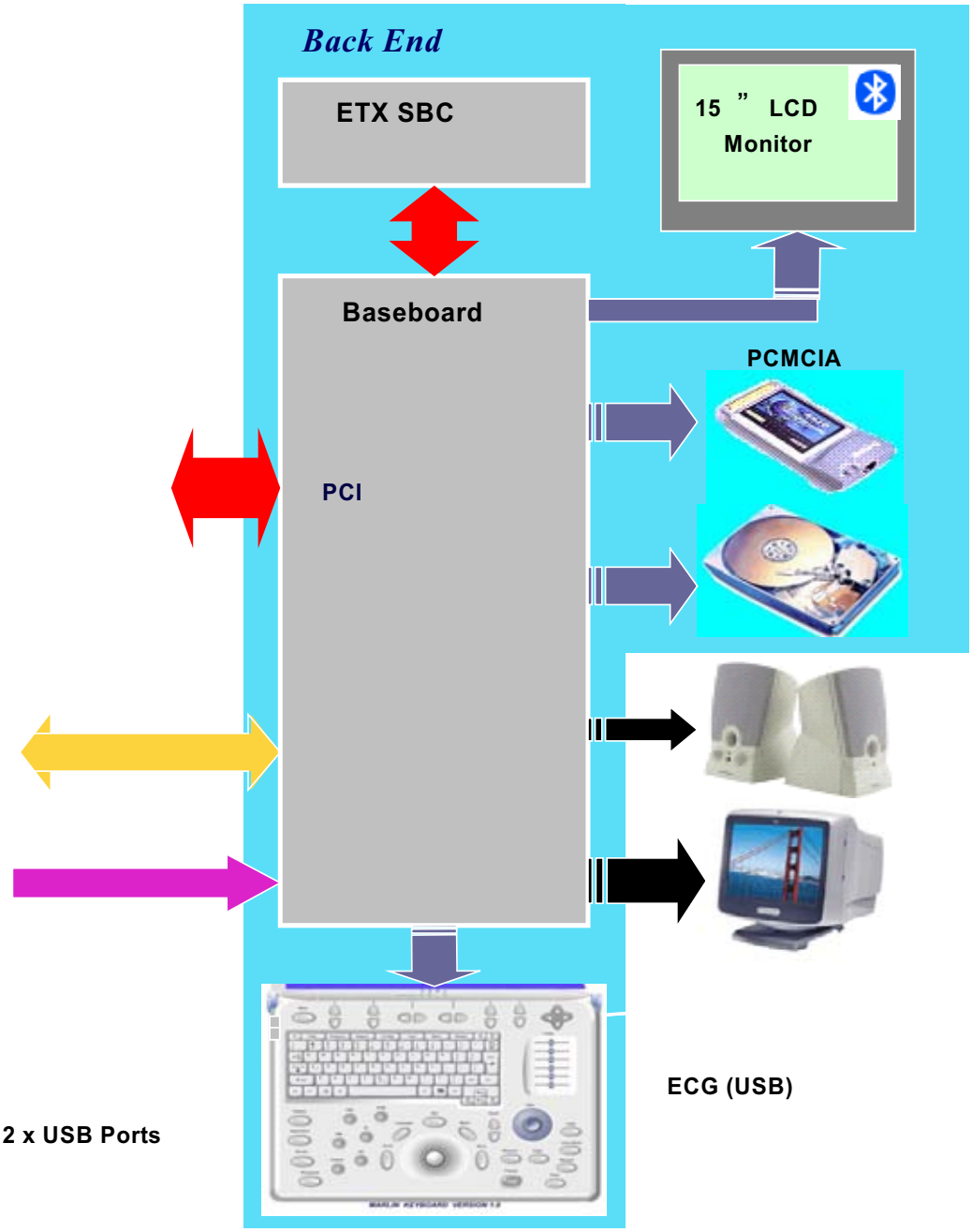


Figure 5-17 Vivid-i™/ Vivid-q™ Back End Processor - Block Diagram

For reference, a list of abbreviations used in this section is provided in Table 5-8 below.

Table 5-8 Abbreviations and Definitions

Abbreviation	Definition
BGA	Ball Grid Array
CS	Component Side
EMC	Electro Magnetic Compatibility
FPGA	Field Programmable Gate Array
HDD	Hard disk drive
MTBF	Mean Time Between Failures
PCI	Peripheral Card Interconnect
PLD	Programmable Logic Device
P&M	Probe and MUX Board
PMC	Power Management Controller
PS	Power Supply

5-4-2 ETX SBC Central Processing Unit (CPU)

The ETX SBC Central Processing Unit (CPU), which is mounted on top of the ETX Base Board (see page 5 - 23), controls and processes the internal Back End Processor operations. In addition, the CPU supports the Front End via the PCI bus.

The CPU utilized in the Vivid-i™ and Vivid-q™ ultrasound unit is a Pentium -M, 1.4 GHz Processor.

5-4-3 ETX Base Board

5-4-3-1 Overview of ETX Base Board Functions

The ETX Base Board connects all the peripheral modules to the ETX single board computer. The CPU (see page 5 - 23) is mounted on top of the ETX Base Board.

The ETX Base Board provides interfaces to the following components:

- HDD
- Front End (RFI) Board
- USB ports
- Docking port, speaker phones and speaker jacks
- Keyboard
- Battery
- VGA
- Fans
- Power supply

The Power Management Controller (PMC), mounted on the ETX Base Board, ensures automatic transition between the various power modes, stable DC condition, and provides power status LED display.

The Docking port, located on the rear panel of the ETX Base Board, provides the connections to the Audio unit on the DIB, discrete control and status lines and 20V-DC power.

Refer to Figure 5-21 on page 5-27 for a view of the ETX Base Board showing the location of the various connectors.

Figure 5-18 below shows a block diagram of the high level functions of the ETX Base Board.

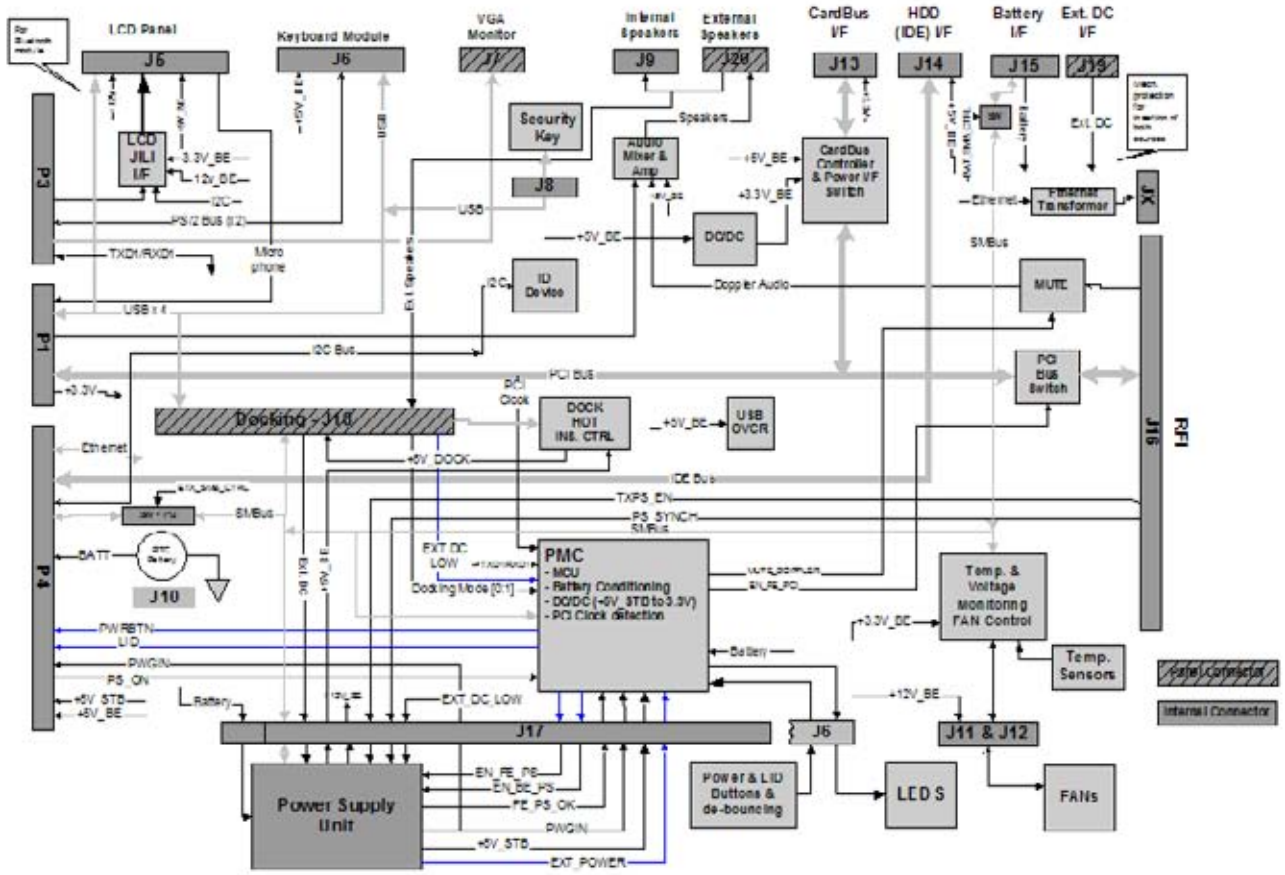


Figure 5-18 ETX Base Board - Block Diagram

5-4-3-2 VGA Interface

The interface to the VGA is via the VGA connector on the rear side of the ETX Base Board. The VGA port is connected to the DIB where VGA signals are converted to DVI and split into three channels to drive the system LCD display (15" or 17", as applicable) and external monitor.

5-4-3-3 CardBus Interface

Not in use.

5-4-4 Hard Disk

The Hard Disk is the main storage device of the Vivid-i™/ Vivid-q™ ultrasound unit. The Hard Disk, which is controlled by the CPU via signals from the IDE Bus, is partitioned into four drives, each of which is designated for different operations, as follows:

- **C: Drive:** Execution of the operating system and the software application, and factory presets. The partition size is 5 GB.
- **D: Drive:** User presets and data. The partition size is 5GB.
- **E: Drive:** Archiving of all images and reports. The partition size is the balance of available space on the hard disk.
- **F: Drive:** Swap file partition. The partition size is 1GB.

The following additional partitions are hidden:

- **Grub:** 32MB
- **Repository:** 10GB

Note: When connected to the system, a DVD device or disk-on-key will not necessarily be shown as G drive.

5-4-5 Fan Control

The Fan board holds five fans and is mounted on the left side of the bottom assembly. A special fan speed controller chip is used to control the fans' speed. The Fan Board is connected to the BEP via the Fan cable.

Each Fan has 3 wires: two 12V wires that supply power to the fans; a 3rd wire for sensing the fans' speed.

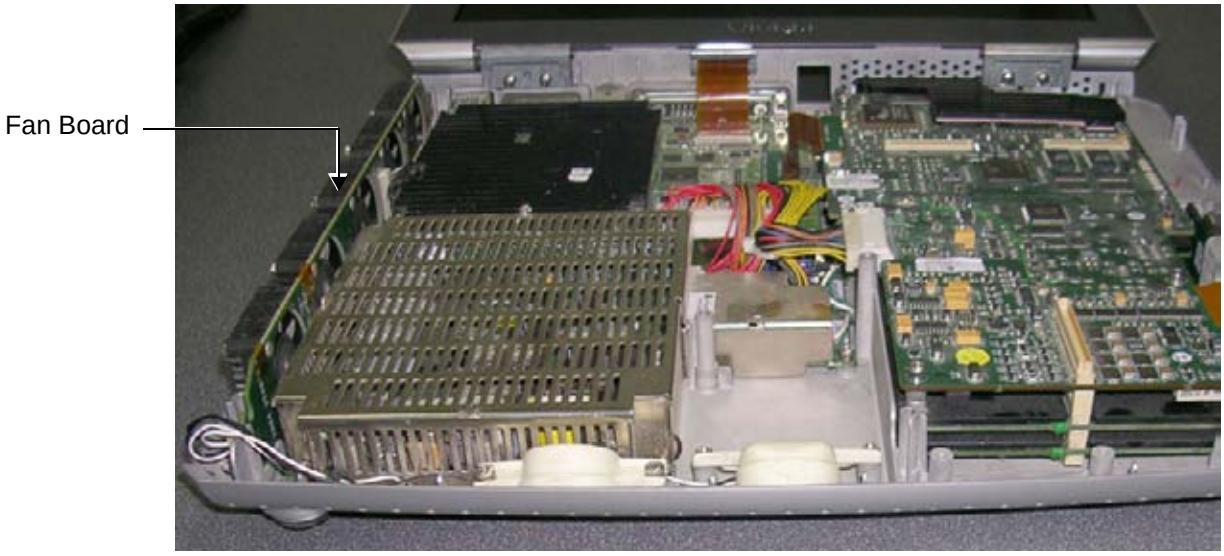


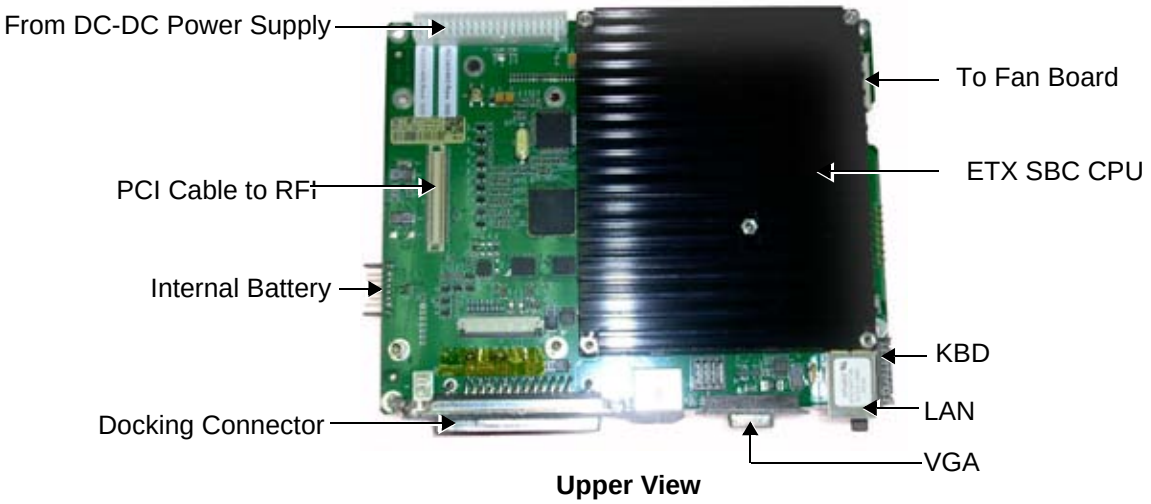
Figure 5-19 Location of Fan Board in the Bottom Assembly

5-4-6 RTC (BIOS) Battery

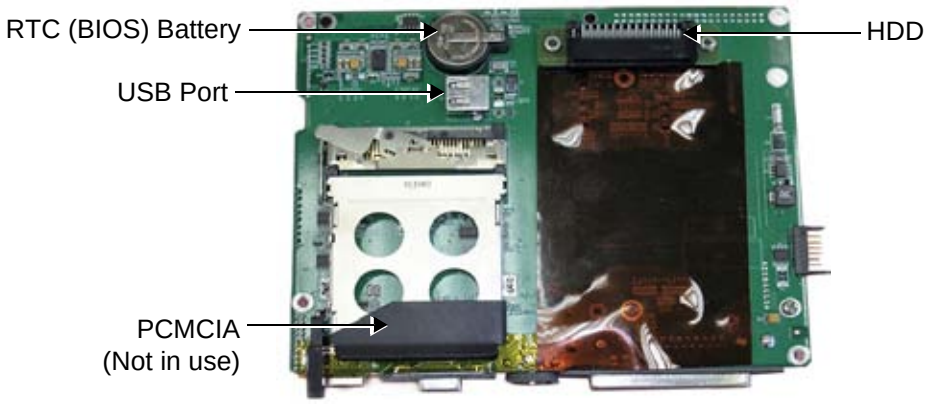
The RTC (BIOS) battery provides power to the ETX real-time clock.

NOTE: ***The RTC (BIOS) Battery should be replaced every 2 years.***
For instructions, refer to BIOS Battery Replacement on page 8 - 52.

5-4-7 Back End Processor - Location of Components



Upper View



Lower View

Figure 5-20 Views of the Back End Processor (BEP)

5-4-7-1 BEP Connectors

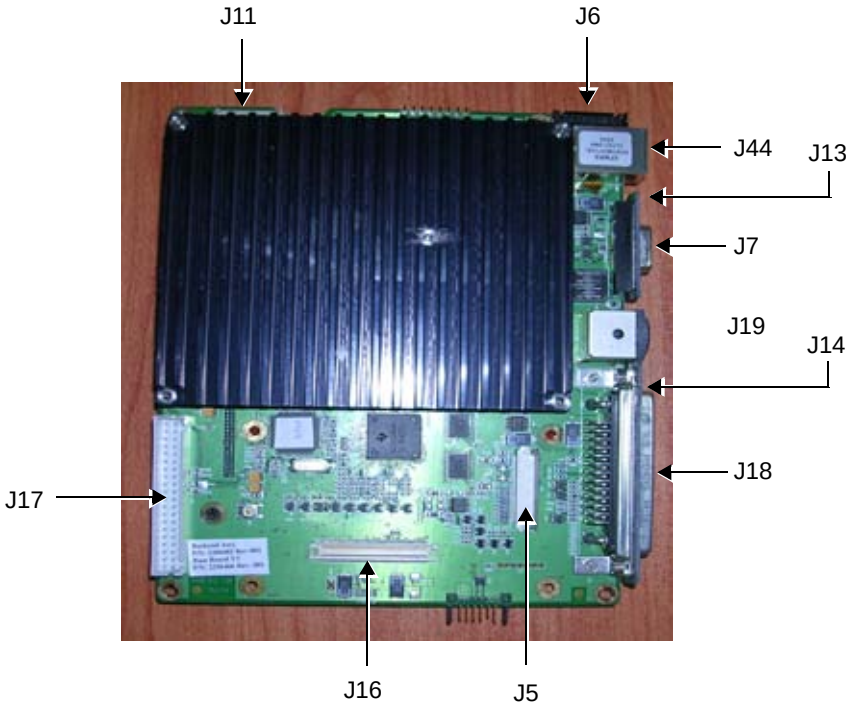


Figure 5-21 Connectors on the BEP

Table 5-9 BEP Connectors

Connector #	Description
J7	VGA
J19	EXT DC INPUT
J18	DOCKING
J20	Speakerphones
J16	RFI
P1:P4[a]	ETX
J5	LCD PANEL
J6	KEYBOARD
J17	PS UNIT
J14	H.D. Adaptor Card
J15	BATTERY
J13	CARDBUS
J10	RTC (BIOS) Battery
J8	Protection Key
J11:J12	FANS
J9	Speakers

a. All connections to P1, P2, P3 and P4 according to ETX specs.

Table 5-10 BEP Input DC Voltages

Input	Description	Connector - PIN#	Connected From
EXT_DC	20 V DC from PS	J17-1, 2, 3, 4, 5	PS
Battery	Varies from 14 V to 16.7 V DC depending on battery capacity. Distributed via PS.	J17-11, 12, 13, 14, 15	PS
+12 V_BE	DC voltage from PS BE indicates Back End	J17-19	PS
5 V_STB	DC voltage from PS STB indicates Standby	J17-20	PS
+5 V_BE	DC voltage from PS BE indicates Back End	J17-21,22, 23, 24	PS

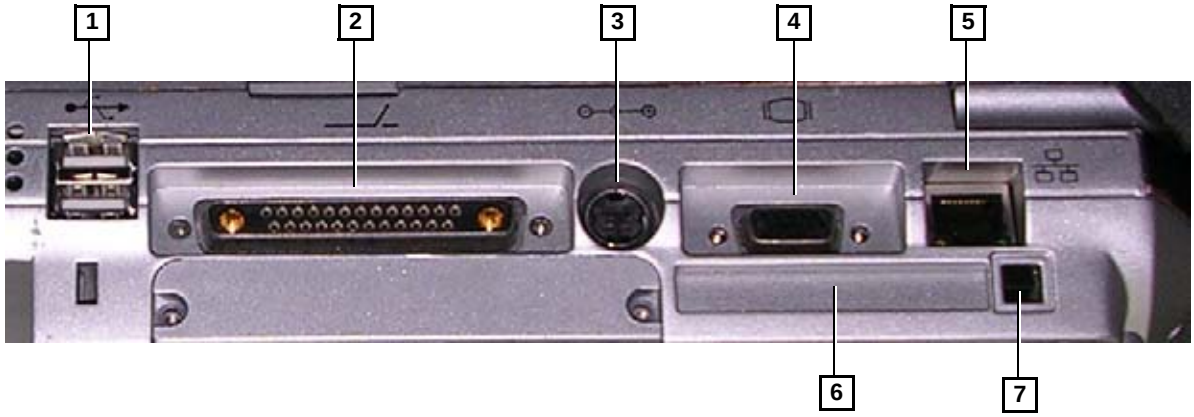
5-4-8 Left/Right Speakers

The L/R speakers are mounted on the front side of the bottom assembly. The audio signals are received via a Jx connector connected to the Fan board - see Figure 5-19 on page 5-25.

Section 5-5
External Input/Output (I/O)

The Vivid-i™/ Vivid-q™ system rear panel provides a few standard connectors for connecting the following external devices:

- VGA port for connecting external monitor of VGA to S-Video adaptor.
- RJ-45 connector for LAN connection.
- Two USB ports for external peripherals
- 20V DC inlet - main DC power to the system.



Legend:

1. Two interchangeable USB ports (digital printer, DVD-RW/CD-RW and other peripherals).
2. Docking connector.
3. Port for DC IN (AC Adapter).
4. SVGA Output (VCR option or CRT monitor option).
5. LAN 10/100 Base-TX Ethernet network connector
6. PCMCIA port for PC card.
7. Ejection lever for PCMCIA device.

Figure 5-22 Vivid-i™/ Vivid-q™System - Rear Panel Connections

Section 5-6
Power Supply System

5-6-1 Electrical Power

The Vivid-i™ and Vivid-q™ systems can operate at between 100 and 240 V at 50/60 Hz via an AC/DC converter which supplies a 20 V DC output and 4.5 amps.

5-6-2 Introduction

The power system comprises two main building blocks:

- **AC/DC Adaptor** - an external unit connected to the system's rear panel (see Figure 5-22).
- **DC/DC Power Supply Unit** - located inside and mounted to the bottom assembly, provides the system with both Low Voltage and High Voltage power, and also enables recharging of the battery.
  - The Power Supply Unit controls the following main functions:
    * Input switching stage - selects between the external DC source and the internal battery
    * Back End Low Voltage power supply (LVPS)
    * Standby power supply
    * Front End Low Voltage power supply (LVPS)
    * Front End High Voltage power supply (HVPS)
    * Battery charger controlled by the Power Management controller
    * Control circuitry (used for monitoring, charger control and auxiliary functions).
    * The PS communicates with the host CPU via the SMBus

5-6-3 Power Supply Unit Components

As shown in Figure 5-23 below, the Power Supply Unit comprises the following components:

- Rechargeable Battery
- PS Controller and Monitor
- DC Source Selector
- Battery Charger
- High Voltage Power Supply (HVPS)
- Low Voltage Power Supply (LVPS)

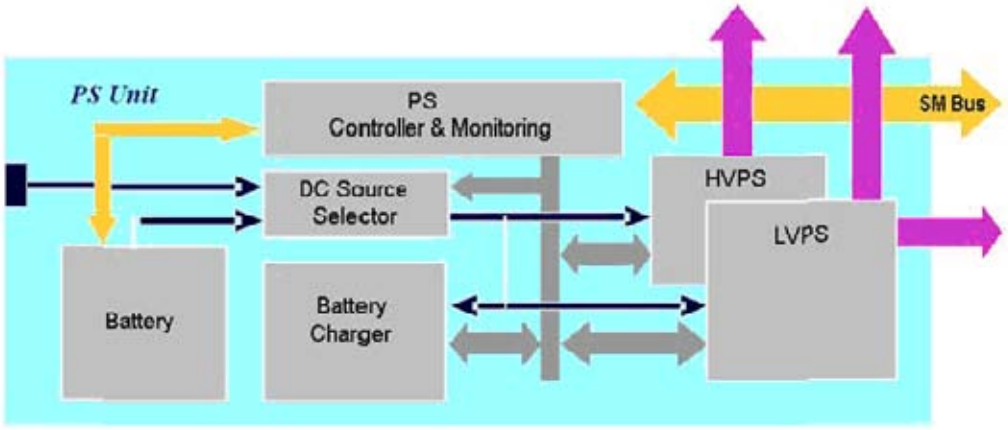


Figure 5-23 Vivid-i™ and Vivid-q™ Power Supply Unit Components - Block Diagram

5-6-3-1 Critical Temperature Sensor

The PS Unit includes temperature sensors. When the monitoring application measures the maximum temperature limit or above, it will shut down the system. After the temperature settles down, the PS unit will enable the DC-DC operation.

5-6-4 DC Source Selector

This circuitry selects the source of the power. When the AC-to-DC converter input into the system is higher than 18 V, the system will be powered by the AC-to-DC converter. Otherwise, the selector will look for an alternative power source (the battery), expecting to receive between 12 and 16V DC.

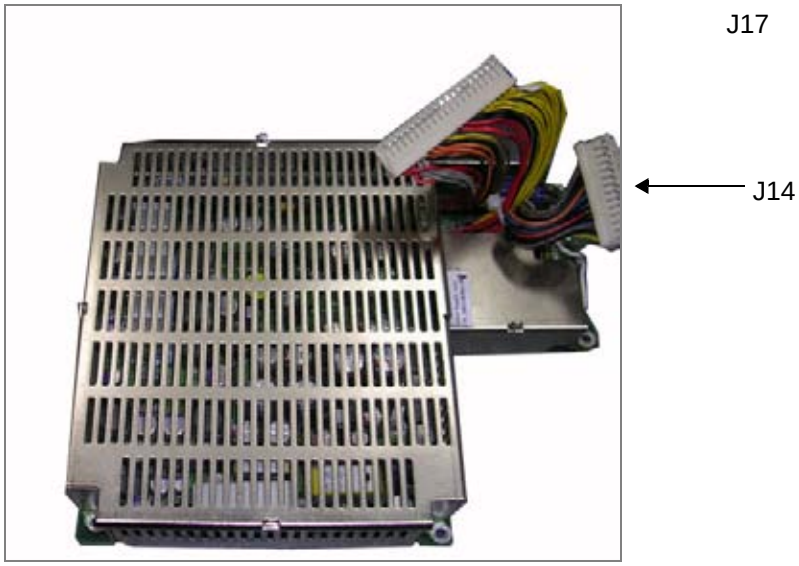


Figure 5-24 DC Source Selector

Table 5-11 DC Source Selector Connectors

Connector #	Description
J14	To RFI
J17	To BEP

5-6-5 Rechargeable Battery Pack Assy (GPA)

The lithium ion rechargeable battery provides a backup mechanism to the Vivid-i™ or Vivid-q™ system whenever an AC power source is not available. The battery module is supplied with a lithium ion rechargeable battery pack (GPA) installed in the battery bay, as standard.

The Vivid-i™/ Vivid-q™ scanner has built-in charger functionality (see Figure 5-23 on page 5-31) and switches automatically from battery operation to AC operation and *vice versa*.

When shutting down the system, leave the main power cable connected to keep the battery fully charged.

NOTE: The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries.

NOTE: The battery is designed to be replaced every 2 years.

CAUTION: The battery is designed to work with Vivid-i™ or Vivid-q™ systems only. Only use the batteries authorized by GE Healthcare.

WARNING: Used batteries should not be placed with common household waste products. Contact your local authority for the location of a chemical waste collection program nearest to you.

CAUTION: The battery has a safety device.

- Do **not** disassemble or alter it. Charge the batteries only when the ambient temperature is between 0° and 65° C (32° and 149° F) and discharge the batteries between -10° and 55° C (14° and 131° F).
- Do **not** short-circuit the battery by directly connecting the battery terminals with metal objects.
- Do **not** heat the battery or incinerate.
- Do **not** expose the battery to temperature over 60° C (140° F). Keep it away from fire and other heat sources.
- Do **not** charge the battery near a heat source, e.g. fire or heaters.
- Do **not** leave the battery in direct sunlight.
- Do **not** pierce the battery with a sharp object, hit it, or step on it.
- Do **not** use a damaged battery. Do not solder a battery.
- Do **not** connect the battery to an electrical outlet.

CAUTION: If the Vivid-i™ or Vivid-q™ portable ultrasound system is not being used for periods of one month or longer, the battery should be removed during lengthy non-use period.

CAUTION: To avoid the battery bursting, igniting, or fumes from the battery causing equipment damage, observe the following precautions:

- Do **not** immerse the battery in water or allow it to get wet.
- Do **not** put the battery into a microwave oven or pressurized container. If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove it and stop using it.
- If you have any questions about the battery, consult GE or your local representative.

Recommended storage conditions of battery pack:

Short term (less than one month): 0° C (32°F) to 50° C (122°F)

Long term (more than three months): 10° C (50° F) to 35° C (95°F).

Section 5-7
Monitor and Operator Panel

5-7-1 Keyboard and Operator Panel

Figure 5-25 below illustrates the layout of the keyboard and operator panel. The buttons and controls are grouped together for ease of use; the different areas of the keyboard and operator panel include the following:

- Soft menu Keys – part of the Extended Keyboard
- TGC
- GAIN rotary
- Alphanumeric KB
- Extended KB
- Trackball
- Trackball buttons
- Front panel
- Hand-rest area of front-panel

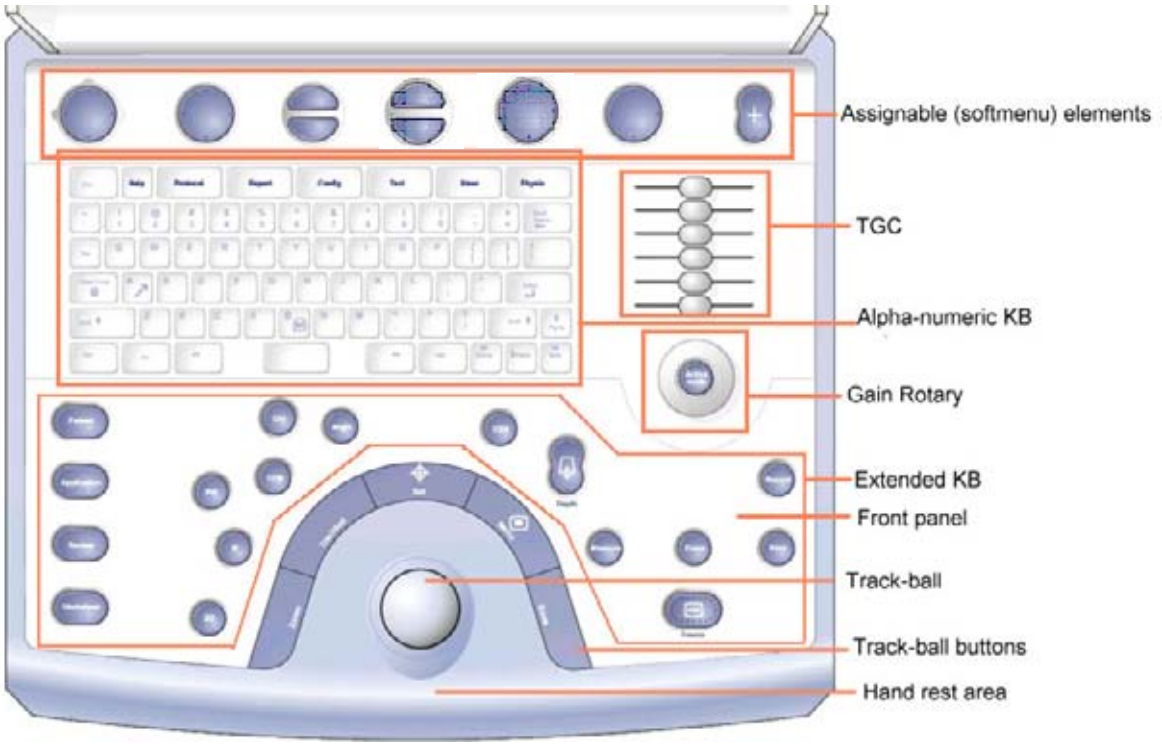


Figure 5-25 Vivid-i™/ Vivid-q™ System — Keyboard and Operator Panel Layout

The Vivid-i™ and Vivid-q™ keyboard unit comprise the main user-interactive devices: an alphanumeric keyboard, a 1.5" trackball, and an extended keyboard. In addition, it includes one or more printed circuit boards (PCBs) designed to carry the various electronic components - these include the keyboards' controller, TGC potentiometers, USB Hub, and backlight illumination.

Figure 5-26 below shows a high-level functional block diagram of the keyboard unit. The individual components are described in the *Keyboard and Operator Panel Components* section, page 5-35.

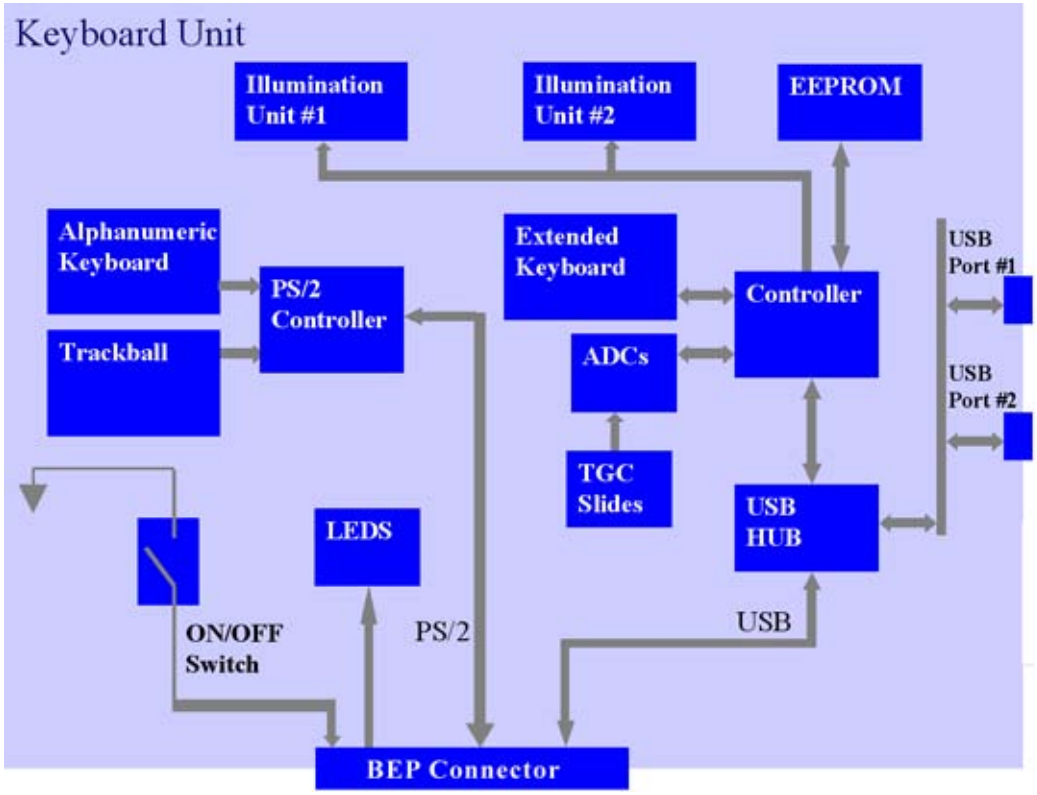


Figure 5-26 Vivid-i™/ Vivid-q™ Keyboard — Block Diagram

5-7-2 Keyboard and Operator Panel Components

5-7-2-1 Power ON/OFF Button

The Power On/Off button receives 3.3 V from the BEP. Once shorted, this voltage is routed to the PMC which will activate or perform the appropriate task, as required.

5-7-2-2 Alphanumeric Keyboard

The Vivid-i™/ Vivid-q™ alphanumeric keyboard, with a key arrangement similar to that of a laptop keyboard, is based on the global GE International standard keyboard requirements.

The alphanumeric keyboard has a PS/2 interface and supports all standard alpha-numeric functionality, such as, auto-repeat, standard ASCII output codes, *etc*.

Specially designed, high-quality key caps - together with controllable backlighting - provide a keyboard that is comfortable and easy to use.

The upper row of functional keys (F1 - F11), are clearly identified as being assigned to specific ultrasound functions.

5-7-2-3 TGC Sliders

There are six linear Time Gain Compensation (TGC) sliders located to below the alphanumeric keyboard, at the left corner (see Figure 5-25 on page 5-34).

These keys, that slide horizontally, are used to compensate for depth-related attenuation in an image.

5-7-2-4 Gain Rotaries

The Gain Rotaries (which may be rotated or pressed) are located above the TGC Sliders. The lower Gain Rotary is used for 2D Gain and the upper Gain Rotary is used for *Active* mode,

5-7-2-5 Extended Keyboard

The Extended keyboard is the ultrasound- specific keyboard which is used to activate the ultrasound system. This keyboard is controlled via the USB hub located on the keyboard PCB.

5-7-2-6 Trackball

The Vivid-i™/ Vivid-q™ operator panel has a 1.5" trackball centrally located above the hand-rest area to provide easy operation.

The trackball has a PS/2 interface and supports a variety of basic PC operations and specific ultrasound controls.

5-7-2-6-1 Trackball Buttons

The buttons surrounding the Trackball (defined as Trackball buttons) can be divided into two groups:

- **Set and Menu Buttons**

  These are equivalent to the normal PC mouse left and right click (**Set** = left-click; **Menu** = right-click). The operation of these buttons is supported via the PS/2 Board.

- **Zoom, Trackball, and Store Buttons**

  These buttons, even though located beside the trackball, are part of the External Keyboard buttons and not part of the Alphanumerical or regular trackball buttons. The operation of these buttons is supported via the USB hub located on the keyboard.

5-7-2-7 Key and Backlight Illumination

The keys on the operator panel are illuminated according to their current status/availability, as follows:

- **Green** - key function is currently *active*.
- **White** - key function is *available* (but not active) in the currently-selected scanning mode and/or options enabled.
- **No illumination** - key is *not available* in the currently-selected scanning mode and/or options enabled.

Three separate backlight illumination functions are provided:

- **On the Alphanumeric Keyboard:**

  The complete alphanumeric keyboard has backlit illumination which is controlled by commands coming from the BEP via the USB Hub.

- **On the Extended Keyboard**:

  Each key on the extended keyboard has its own backlight illumination which is controlled by the BEP via the USB Hub. Available keys are illuminated.

- **Active Key Backlight**:

  Keys which have an On/Off position (enabled/disabled) are illuminated with a green backlight to inform a user of the current state.

5-7-2-8 USB Hub

The USB connection arrives from the BEP. The USB hub drives the following devices:

- Keyboard controller
- Two general-purpose ports
  (current up to 600 mA per port, over-current limit should be used).

5-7-2-9 Power Interface

Power to the keyboard is provided via the BEP keyboard connector.

Two different voltages are supplied to the keyboard:

1.) 3V standby for driving the power On/Off and status LEDs.
2.) 5V BE (Back End) is used for the remaining circuits.

The keyboard operates with ±5% voltage deviation on each supply.

The keyboard has current-limiting circuitry (implemented on the BEP), to protect it against excessive current consumption (via the USB and/or short circuits).

5-7-2-10 Keyboard ID

The keyboard PCB contains an EEPROM which stores a variety of information about the keyboard such as, GE part number, manufacturing date, and revision # of the PCB hardware.

The EEPROM size is 1KB.

5-7-2-11 Keyboard Connectors

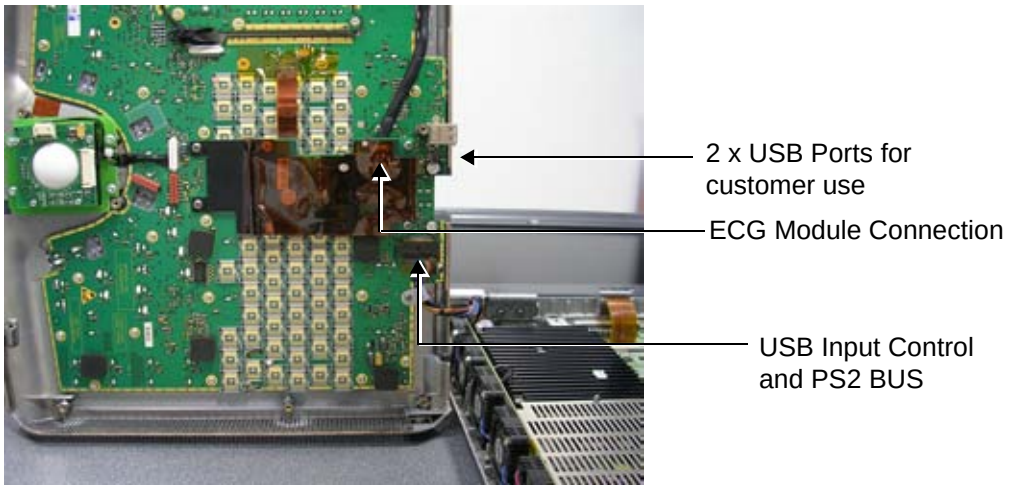


Figure 5-27 Keyboard Module Connectors

5-7-2-12 LCD Display Unit

The display monitor is a 15" LCD and is connected via a flex cable to the BEP, as shown in Figure 5-28.

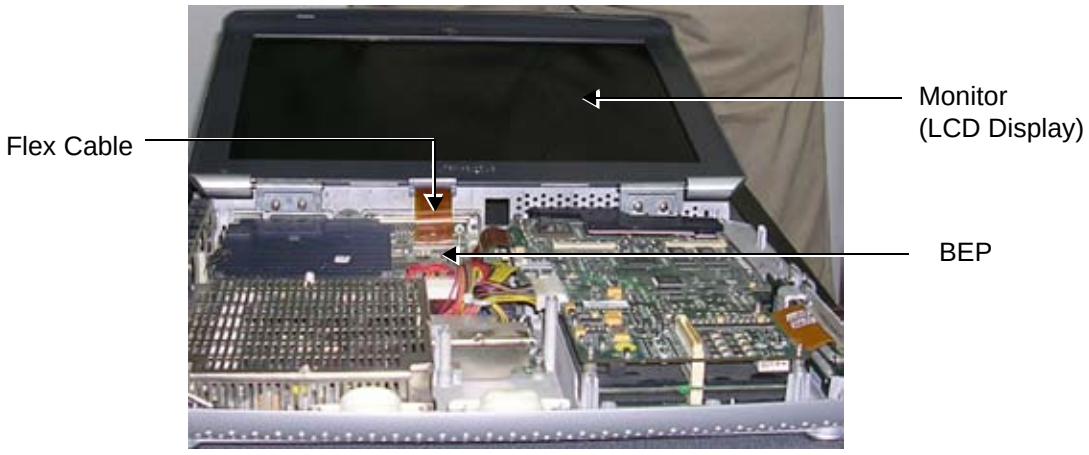


Figure 5-28 LCD Display - Flex Cable Connection to BEP

Section 5-8
ECG Module

5-8-1 Overview

The Vivid-i™/ Vivid-q™ ECG Patient I/O module is designed to enable acquisition of the following signals: ECG and external ECG. The different pins on the ECG input connector are specifically assigned to support either External ECG or Internal ECG:

- The Internal ECG module supports acquisition of two bipolar ECG channels: leads I, II.
- The External ECG module supports acquisition of a single bipolar ECG input channel ranging from -1 to +1 volt allowing amplification of 1000. The minimal allowed impedance is 10 M ohm.

The ECG module is located under the keyboard assembly (see Figure 5-6 on page 5-9). All power and communication is supplied to the ECG module via the USB hub located in the keyboard module as shown in Figure 5-29 below.

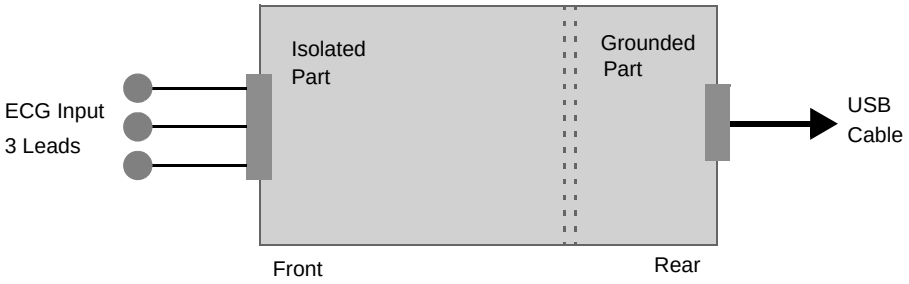


Figure 5-29 ECG Patient I/O Module

A general block diagram of the ECG Patient I/O Module is shown in Figure 5-30 below.

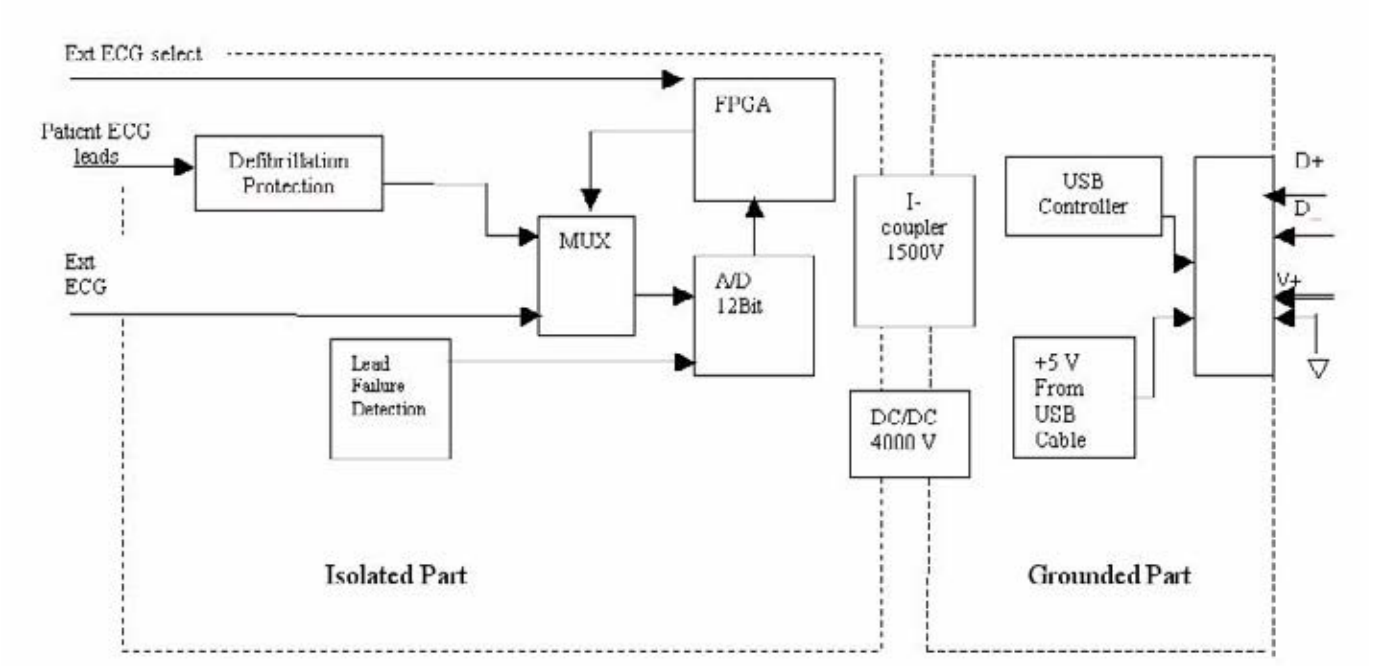


Figure 5-30 ECG Patient I/O Module - Block Diagram

5-8-2 ECG Patient I/O Module Specifications

5-8-2-1 Power Consumption

The ECG and Ext-ECG modules use 5 V (taken from the USB socket on the host).

Estimation: 80mA for ECG function and 50mA when working with EXT-ECG function.

5-8-2-2 Sample Rate

Sampling rate of the ECG signals is: 600 samples/second.

5-8-2-3 Bandwidth

The ECG Bandwidth is 0.05 to 150Hz.

5-8-3 Isolation

The ECG signals are isolated from the Vivid-i™ or Vivid-q™ system to comply with IEC601-1 type CF device classification. All leakage and auxiliary currents apply the values listed in Table 5-12 below (taken from table IV in IEC601-1, section 19.3):

Table 5-12 Leakage and Auxiliary Current Values

Leakage Current	Normal Condition	Single Fault Condition
Earth leakage current	0.5mA	1mA
Enclosure leakage current	0.1mA	0.5mA
Patient leakage current	0.01mA	0.05mA
Patient auxiliary current	0.01mA	0.05mA

The ECG signals have double, reinforced isolation (B-a) from live parts. Hence, creepage distance and air clearance in the module are 8 mm and 5 mm respectively, to withstand 4000 volts isolation between applied part and grounded part.

The applied parts and enclosure have basic isolation (B-a).Therefore, creepage distance and air clearance in the module are 4 mm and 2.5 mm respectively, to withstand 1500 volts isolation between applied parts and enclosure.

Section 5-9
ECG/Respiratory Module

The Internal ECG/Respiratory Board enables ECG, Respiratory and External ECG functionality, as explained in Section 5-9-1, below.

The installation of the Internal ECG/Respiratory Board is prerequisite for using the External ECG/ Respiratory Interface, as explained in Internal ECG/Respiratory Board on page 5 - 41.

5-9-1 Internal ECG/Respiratory Board

5-9-1-1 Overview

The Vivid-i™ and Vivid-q™ Internal ECG/Respiratory module is designed to enable acquisition of the following signals: ECG, Respiratory and external ECG.

The Internal ECG/Respiratory Board is located in the cabinet cage assembly (refer to Figure 5-6 on page 5-9). All power and communication is supplied to the ECG module via the USB hub located in the keyboard module as shown in Figure 5-31, below.

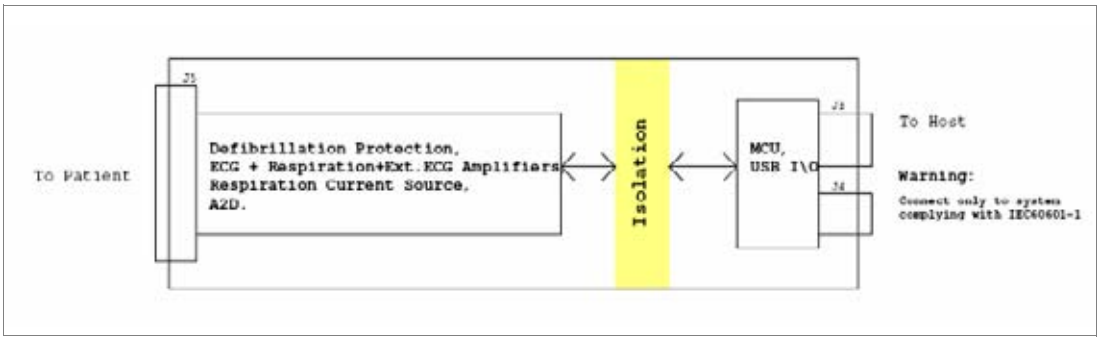


Figure 5-31 ECG/Respiratory Board - Power and Communication

Connections to and from the Internal ECG/Respiratory Board directly to the patient are illustrated in Figure 5-32, below.

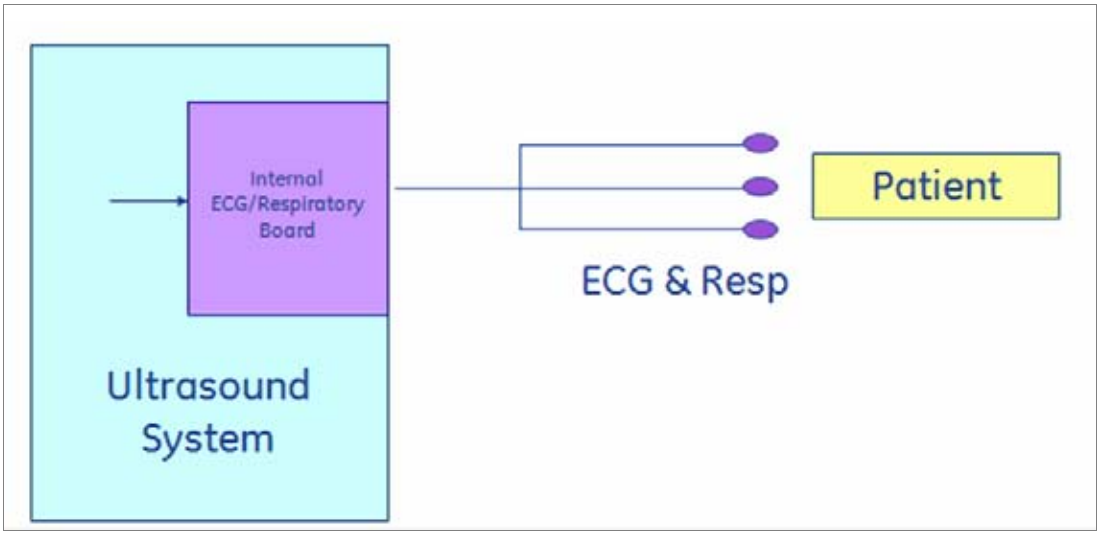


Figure 5-32 Connection between the Internal ECG/Respiratory Board and the Patient

5-9-1-2 Specifications

Table 5-13 Internal ECG/Respiratory Board Specifications - General

Characteristic	Specification
Ground Isolation	4 kV rms

Table 5-14 Internal ECG/Respiratory Board Specifications - ECG

Characteristic	Specification
Patient Cable	3 leads IEC/AHA codes
Input Range (ac)	10 mV peak-to-peak
Input Range (dc)	Up to ± 850 mV
Bandwidth (-3db)	1.98 — 31.2 Hz (for Monitor use only)
Lead Fault Indicator	Yes
A2D resolution	12 bit, 2'complement
Sample Rate	1000

Table 5-15 Internal ECG/Respiratory Board Specifications - External ECG

Characteristic	Specification
Input Range (ac)	10 V peak-to-peak
Bandwidth (-3db)	0.8 — 65.5 Hz (65.5 Hz in firmware)
Lead Fault Indicator	Yes
A2D resolution	12 bit, 2'complement
Sample Rate	1000

Table 5-16 Internal ECG/Respiratory Board Specifications - Respiration

Characteristic	Specification
Excitation signal characteristics	121 µA RMS ± 5° at 55.5 kHz
Base impedance	100 — 1500 Ohm
Impedance dynamic range	10 Ohm peak-to-peak
Bandwidth (-3db)	0.16 —1.3Hz
Lead Fault Indicator	Yes, Base impedance > 1500 Ohm
A2D resolution	12 bit, 2'complement
Sample Rate	1000

NOTE: Respiration function is not recommended for use on paced patients.

5-9-2 External ECG/Respiratory Interface

5-9-2-1 Overview

Connections to the external monitor are illustrated in Figure 5-33, below.

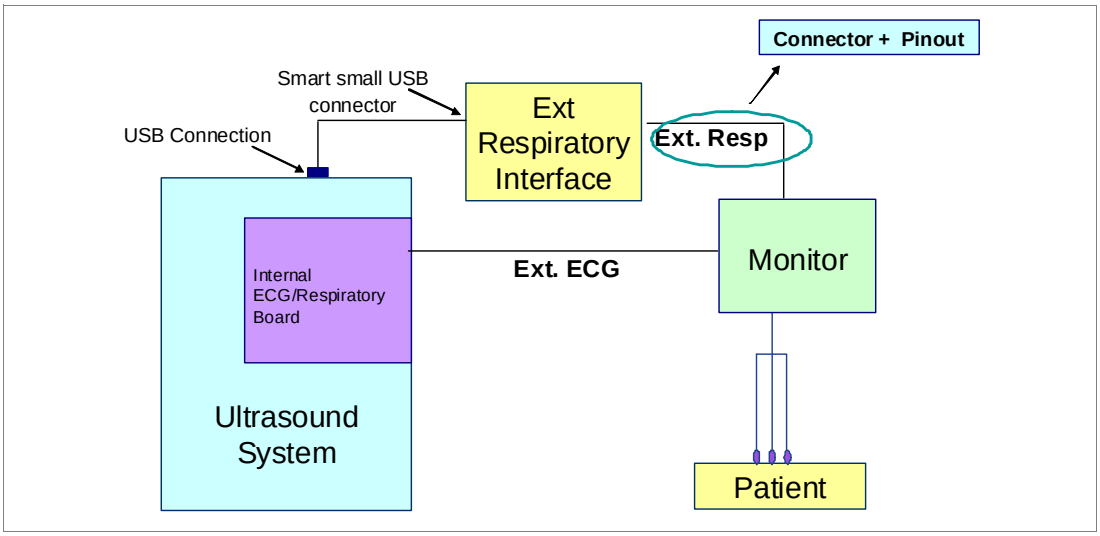


Figure 5-33 Connections to the External Monitor

The External ECG/Respiratory Interface module has a maximum 2Vpp (Volt peak-to-peak) input with a maximum frequency of 100Hz. The inputs are differential.

There are three optional connections for the External Respiratory interface (refer to Figure 5-34), depending on the Respiratory Monitor output type being used, as follows:

- **Option 1 - Monitor with single-ended Positive output**
  - Connect the "signal" lead to pin 2 on the connector
  - Connect the ground shielding to pins 5 and 7 on the connector
- **Option 2 - Monitor with single-ended Negative output**
  - Connect the "signal" lead to pin 5 on the connector
  - Connect the ground shielding to pins 2 and 7 on the connector
- **Option 3 - Monitor with Differential output**
  - Connect the positive "signal" lead to pin 2 on the connector
  - Connect the negative "signal" lead to pin 5 on the connector
  - Connect the ground shielding to pin 7 on the connector

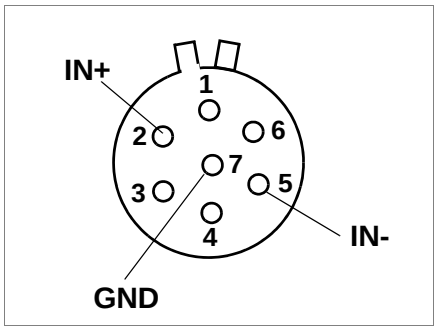


Figure 5-34 Pin Layout for External Respiratory Interface Connector

5-9-2-2 Specifications

Table 5-17 External ECG/Respiratory Interface Specifications

Characteristic	Specification
Input Range (ac)	2v peak to peak
A2D resolution	12 bit ,2'complement
Sample Rate	500 [samples/second]
Ground Isolation	4 kV rms

5-9-2-3 Connectors

Table 5-18 Connector Pin Out J5 (ECG, Respiration, External ECG)

Pin Number	Specification
1	External ECG Input
2	ECG Input, Respiration Input/Output (LL)
3	ECG Input, Respiration Input/Output (RA)
4	ECG Respiration Output (LA)
5	External ECG Select Signal Input (Short to GND on Cable)
6	GND (GND for External ECG or Shield for ECG)

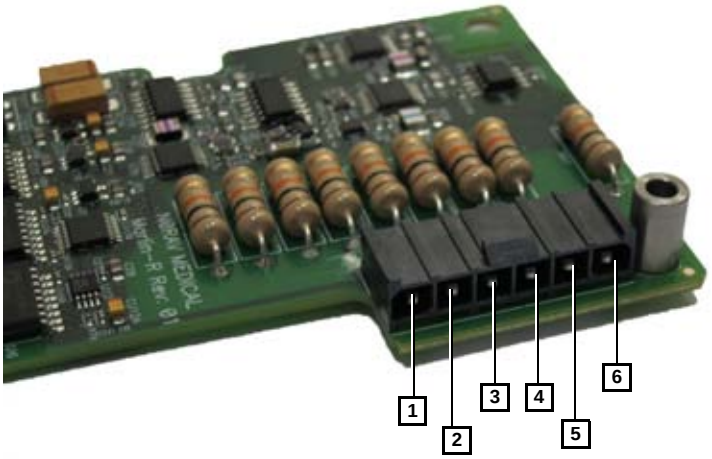
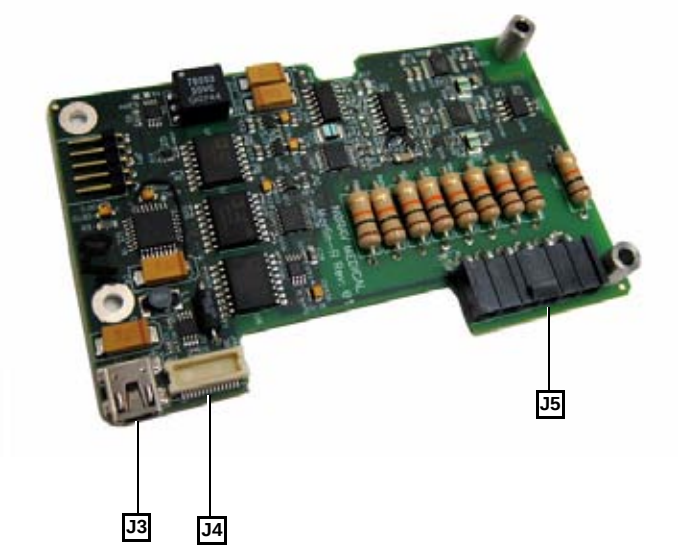


Table 5-19 Connector Pins Out J3, J4 (USB)

Pin Number	Specification
J3-1, J4-28, J4-30	VUSB 5V DC Input from USB Bus
J3-2, J4-8	D-, USB differential Data signal
J3-5, J3-shell	D-, USB differential Data signal
J4-1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 2, 4, 6, 10, 12, 14,16, 20, 22, 24, 26	GND, USB Bus GND



Section 5-10
Peripherals

5-10-1 Introduction

The following peripherals are used with the Vivid-i™ and Vivid-q™ portable ultrasound scanner:

- Black & White Digital Printer (connected via USB)
- Color Digital Printer (connected via USB)
- Color Inkjet Printer (connected via USB)
- DVD/CD-RW (connected via USB)
- MOD (connected via a SCSI-to-USB converter)
- Wireless Network Adapter (connected via USB)
- VCR connected via a VGA to S-Video adaptor using the VGA output

All peripherals are connected via the external USB ports.

5-10-1-1 Printers

5-10-1-1-1 Black & White Digital Printer

The B&W Digital Printer receives image data and the print command via the USB port which is controlled by the keys **Print** or **Alt+Print** on the Vivid-i™ or Vivid-q™ operator panel.

5-10-1-1-2 Color Digital Printer

The Color Digital Printer receives image data and the print command via the USB port which is controlled by the keys **Print** or **Alt + Print** on the Vivid-i™ or Vivid-q™ operator panel.

5-10-1-1-3 Color Inkjet Printer

The Color Inkjet Printer is used to print out reports and exams and is controlled in one of two ways, depending on the system configuration:

- Directly via the USB port
- Via LAN connection

The printing operation to the Color Inkjet Printer is performed by pressing the **Alt+P** keys. Normally, inkjet printers are used to print out Reports but in some cases, also ultrasound images.

5-10-1-2 DVD/CD Reader and CD Writer (DVD/CDR-W)

The DVD/CDR-W is used to back-up images and reports, in a similar way as using the MOD. In addition, the DVD/CDR-W is used as the main source of software upgrades and other service utility operations. Capable of reading all types of CDs including DVD, the DVD/CDR-W is controlled by the BEP via the USB port.

5-10-1-3 Magneto-Optical Drive (MOD)

The MOD is used to back-up images and Reports. The Back up process enables storage of the images and Reports for future review on Vivid-i™ or Vivid-q™ ultrasound units, or other EchoPac-compatible devices. The MOD is controlled by the CPU via a USB port supported by a USB-to-SCSI converter. Only 2.3 GB media are officially DICOM compatible. Magneto-Optical media of any other size (up to 9.2 GB) may be used for back-up, but will not be compatible with DICOM (even though they will be supported by a variety of GE DICOM reviewing stations such as, EchoPac).

5-10-1-4 Wireless Network Adapter

The Vivid-i™ and Vivid-q™ supports a unique type of Wireless Network Adapter. For details regarding type and installation, refer to Wireless USB Network Adaptor on page 3 - 28.

The Wireless Network Adapter provides a mobile network connection to the local area network. The Wireless Network Adapter is supported via the USB port.

Section 5-11
Cooling System

5-11-1 General Information

The Vivid-i™/ Vivid-q™ cooling system comprises five fans, which are directly controlled through the FAN controller module, by the monitoring application. The fans withdraw air from the system through the side vents, removing the warm air from around the internal components, as shown in Figure 5-35 below.

The structure of Vivid-i™ and Vivid-q™ internal components has been designed to provide the best thermal conduction, allowing the maximum amount of heat to be removed from the system. It is crucial that the system ventilation access is not blocked; a distance of at least 20 cm from right and left sides of the system should be kept clear. In addition, operating the system in an unclean environment could introduce foreign objects into the unit and create blockage of the airflow, which may eventually cause irreparable damage to the system. There are therefore some minimal environmental conditions that should be provided for optimum operation of the system - for details and recommendations, refer to Table 2-2 on page 2-2.

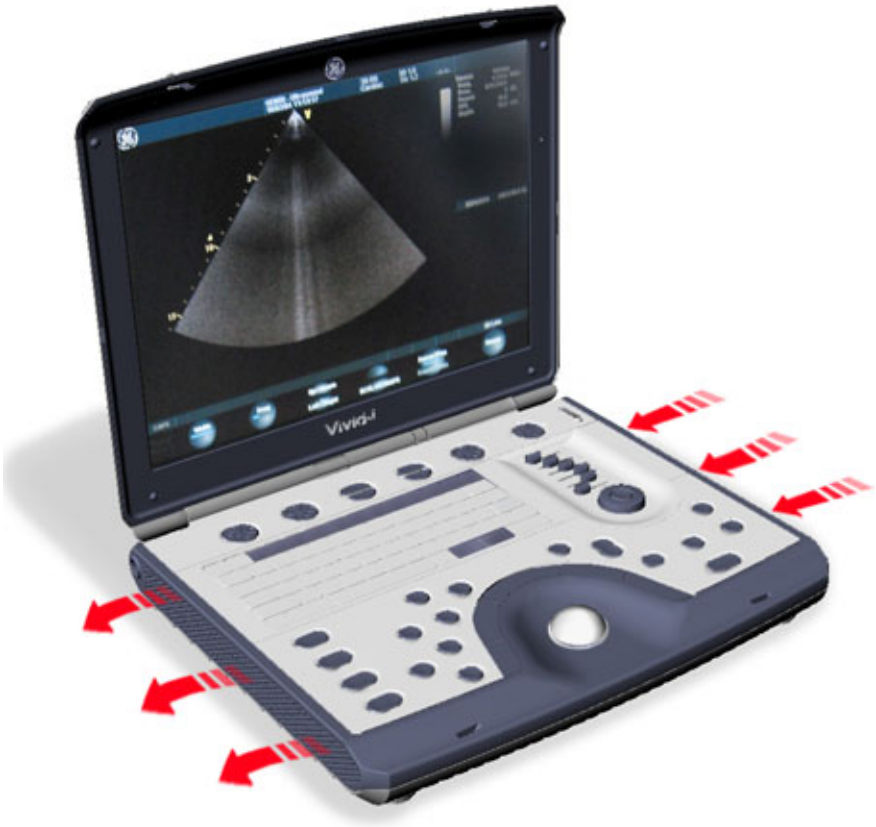


Figure 5-35 Air Flow through the Vivid-i™/ Vivid-q™ Ultrasound Scanner

Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of Chapter 6

This section provides references to the procedures required for testing and adjusting the Vivid-i™/Vivid-q™ portable ultrasound scanner. These tests are optional, and may be used to check the system for errors.

NOTE: There are no voltage adjustments required.

6-1-2 LCD Display Adjustments and Calibration

Overall low image quality or "shades" visible on the Vivid-i™/ Vivid-q™ LCD Display may be the result of improper monitor calibration. Therefore, adjustments may be made to the *Contrast, Brightness*, *Watermark* and/or *Blue Tint*, as required.

Important: LCD Display adjustments should be made in the correct order, as stated in the following procedures.

NOTE: Incorrect calibration of the Vivid-i™/ Vivid-q™ monitor may also result in less than optimal image quality when reviewing images on a DICOM or EchoPAC station.

Access the Calibration Screen (by pressing <**ALT**>+<**Q**>), then follow the relevant procedure instructions described below.

*NOTE: On systems with older software versions, press <**CTRL**>+<**ALT**>+<**P**> to enter the Calibration Screen.*

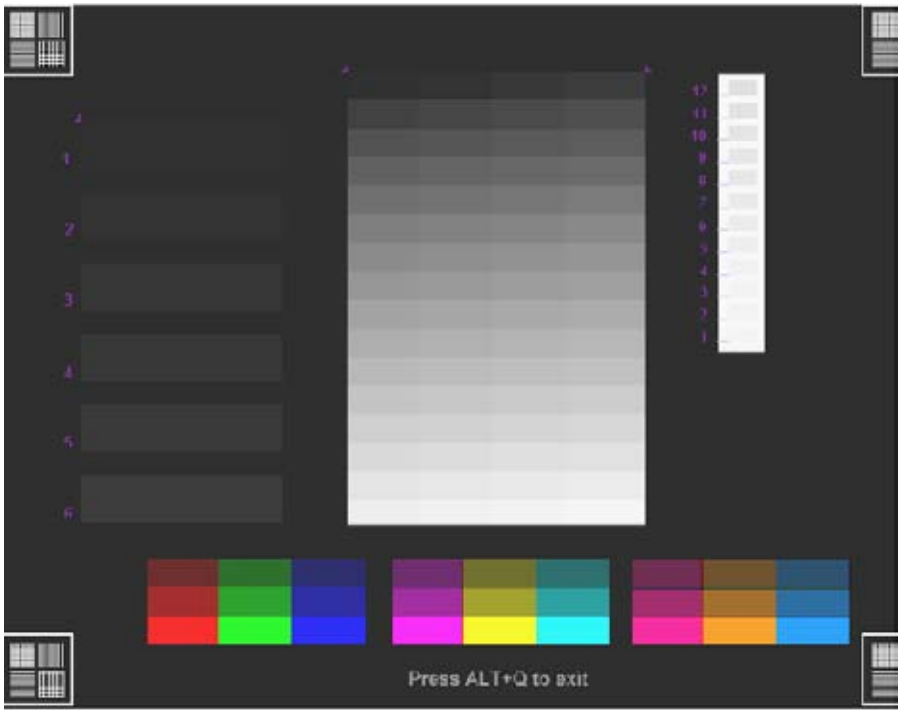


Figure 6-1 LCD Display Calibration Screen

*NOTE: The Hot keys used to exit the Calibration Screen are: <**ALT**>+<**Q**>.*

6-1-2-1 Contrast Adjustment Procedure

- **To adjust the Contrast:** hold down <**ALT**>:
  - Repeatedly pressing **Steer** ← to ***decrease*** the Contrast;
  - Repeatedly pressing **Steer** → to ***increase*** the Contrast.

  To assist in making Contrast adjustments, an adjustment bar is displayed below the screen:

Figure 6-2 LCD Display - Contrast Adjustment

Note: It is highly recommended to set the contrast to maximum. Press <**ALT**>+<**Steer Right**> to *increase* the number of green bars to 7 (maximum).

6-1-2-2 Brightness Adjustment Procedure

- **To adjust the Brightness:** hold down <**ALT**>:
  - Repeatedly press **Pg Dn** ↓ to ***decrease*** the brightness
  - Repeatedly pressing **Pg Up** ↑ to ***increase*** the brightness.

  To assist in making Brightness adjustments, an adjustment bar is displayed below the screen:

Figure 6-3 LCD Display - Brightness Adjustment

Note: The screen Brightness is calibrated when the dark blocks on the left (numbers 1 through 6) and the white bars on the right (numbers 1 through 12) are all visible.

6-1-2-3 Testing Your Contrast and Brightness Settings

Observe the **V** watermark on the lower part of the monitor beside the soft keys on the screen. The monitor is set to optimal settings when you just ***start*** seeing the **V**.

Figure 6-4 LCD Display - V Watermark Adjustment

- If you do not see the **V**, the monitor is set too dark.

- If the **V** is clearly visible, the monitor has too much contrast or is set too bright.

The Test Pattern in the Calibration Screen (refer to Figure 6-1 on page 6-1) may be used for Advanced Settings. (Press Alt + Q to access the Test Pattern).

6-1-2-4 Blue Tint Adjustment Procedure

This will make the white shades shift a bit towards bluish.

- **To adjust the Blue Tint:** hold down <**ALT**>, then use the **<** and **>** keys, as required.

  Repeatedly pressing **<** will ***decrease*** the blue tint; repeatedly pressing **>** will ***increase*** the blue tint.

  To assist in making blue tint adjustments, an adjustment bar is displayed below the screen:

Figure 6-5 LCD Display - Blue Tint Adjustment

6-1-3 Keyboard Adjustments

6-1-3-1 Backlighting Intensity Adjustment Procedure

To make adjustments to the Keyboard Backlighting intensity, follow the procedure described in Adjust Keyboard Backlight Intensity on page 3 - 82.

6-1-4 Configuring Print Orientation

For information on Print Orientation (Portrait or Landscape), refer to Configuring Printing Orientation (Portrait or Landscape) and Paper Size on page 3 - 47.

6-1-5 Video System Adjustments

6-1-5-1 Video System Adjustment Procedure

For details on Video System adjustments (PAL or NTSC setup), refer to Figure 3-51 on page 3-54.

6-1-6 Beamformer Calibration

6-1-6-1 Beamformer Calibration Procedure

For details on Beamformer Calibration adjustments, refer to *Chapter 7 - Diagnostics/Troubleshooting*.

6-1-7 Battery Calibration

NOTE: It is recommended to perform the Battery Calibration procedure when the battery is fully charged (as much as the system allows) and preferably to commence the procedure towards the end of the working day - then allow it to continue to run automatically, overnight. For details, see Figure 6-6 below.

IMPORTANT: ***During the Battery Calibration procedure, no scanning can be performed!***

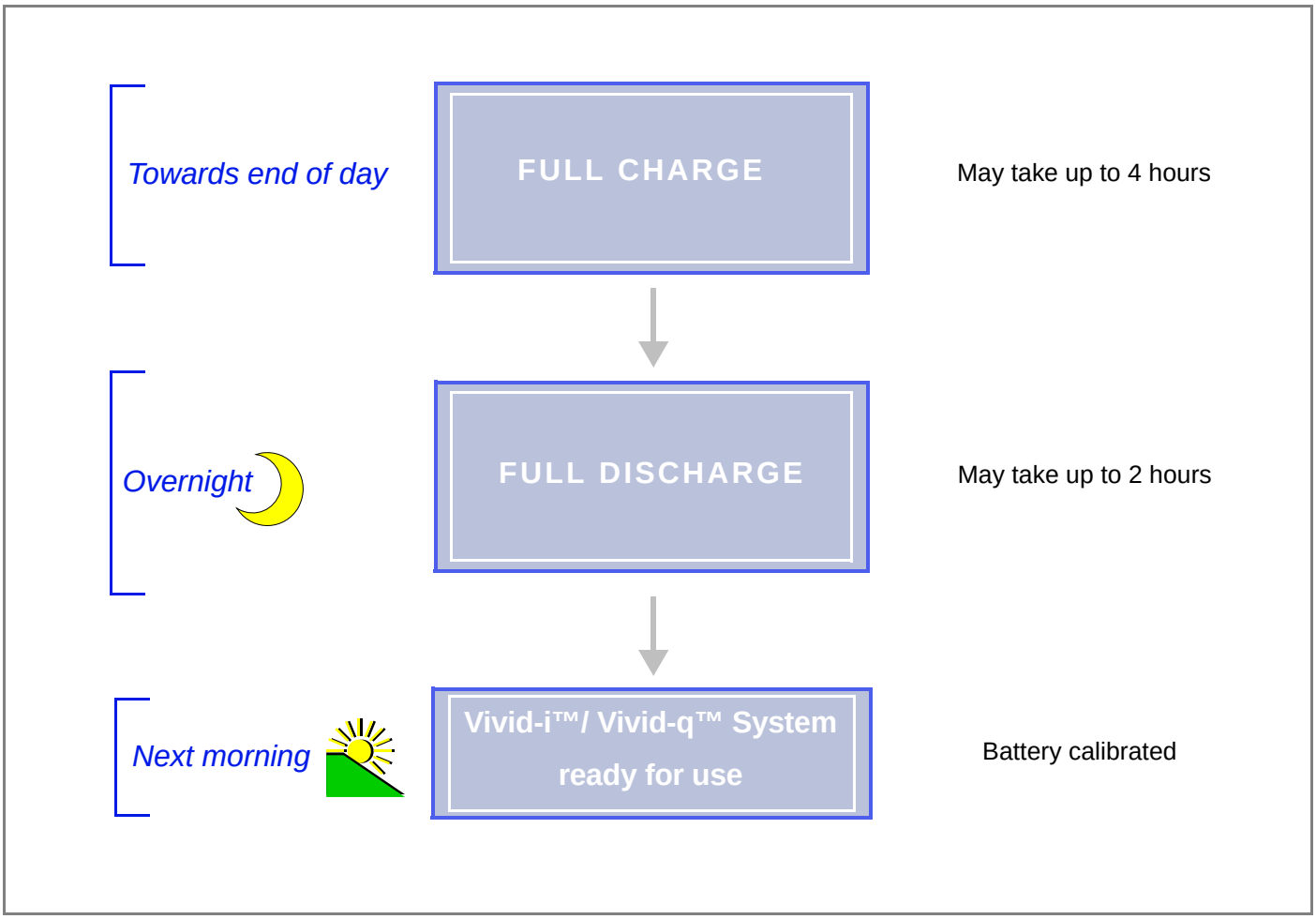


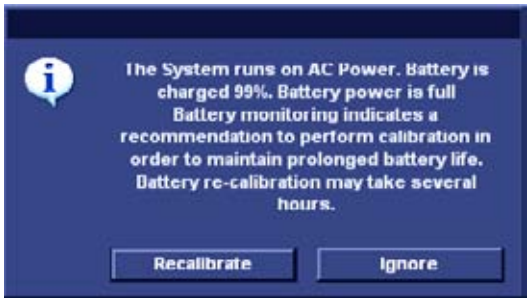
Figure 6-6 Recommendations - Battery Calibration Procedure

Note: For step-by-step instructions, see Performing the Battery Calibration Procedure on page 6 - 6.

6-1-7-1 Performing the Battery Calibration Procedure

NOTE: It is recommended to commence this procedure towards the end of the working day (when the battery is fully charged) then allow the procedure to be completed overnight, as outlined in Figure 6-6.

1) Click on the battery icon at the bottom of the scanning screen
OR
from the message window shown below, click **Recalibrate**.


The System runs on AC Power. Battery is charged 99%. Battery power is full
Battery monitoring indicates a recommendation to perform calibration in order to maintain prolonged battery life.
Battery re-calibration may take several hours.
Recalibrate
Ignore

The Battery Calibration Wizard (Page 1) opens - Figure 6-7.

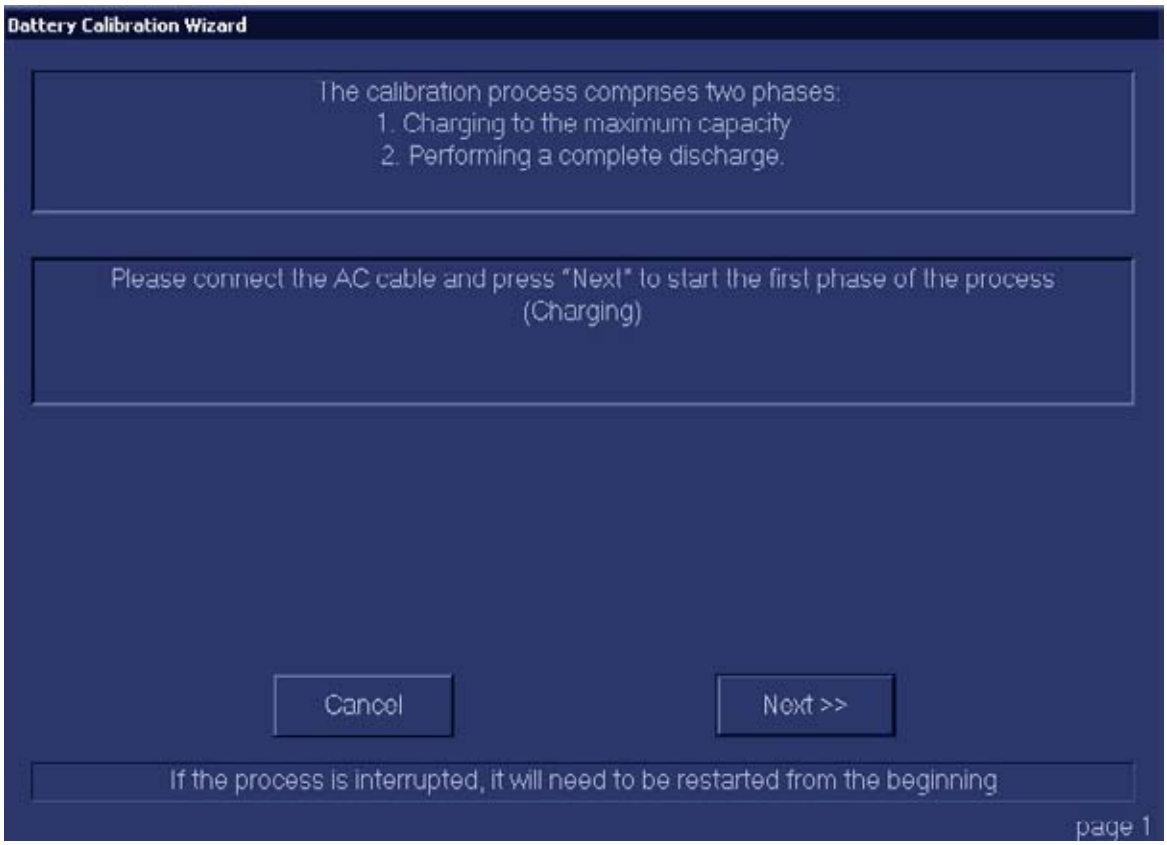

Battery Calibration Wizard
The calibration process comprises two phases:
1. Charging to the maximum capacity
2. Performing a complete discharge.
Please connect the AC cable and press "Next" to start the first phase of the process (Charging)
Cancel
Next >>
If the process is interrupted, it will need to be restarted from the beginning
page 1

Figure 6-7 Battery Calibration Wizard - Page 1

2.) Make sure the AC power cable is connected to the Vivid-i™/ Vivid-q™, then click **Next** to commence the first stage of the process (Full Charge to maximum capacity).

This step will fully recharge the battery and may take up to 4 hours.

3.) Wait for the confirmation window to be displayed showing that the battery is fully charged.

(See *Battery Calibration Wizard Page 2 in Figure 6-8).*

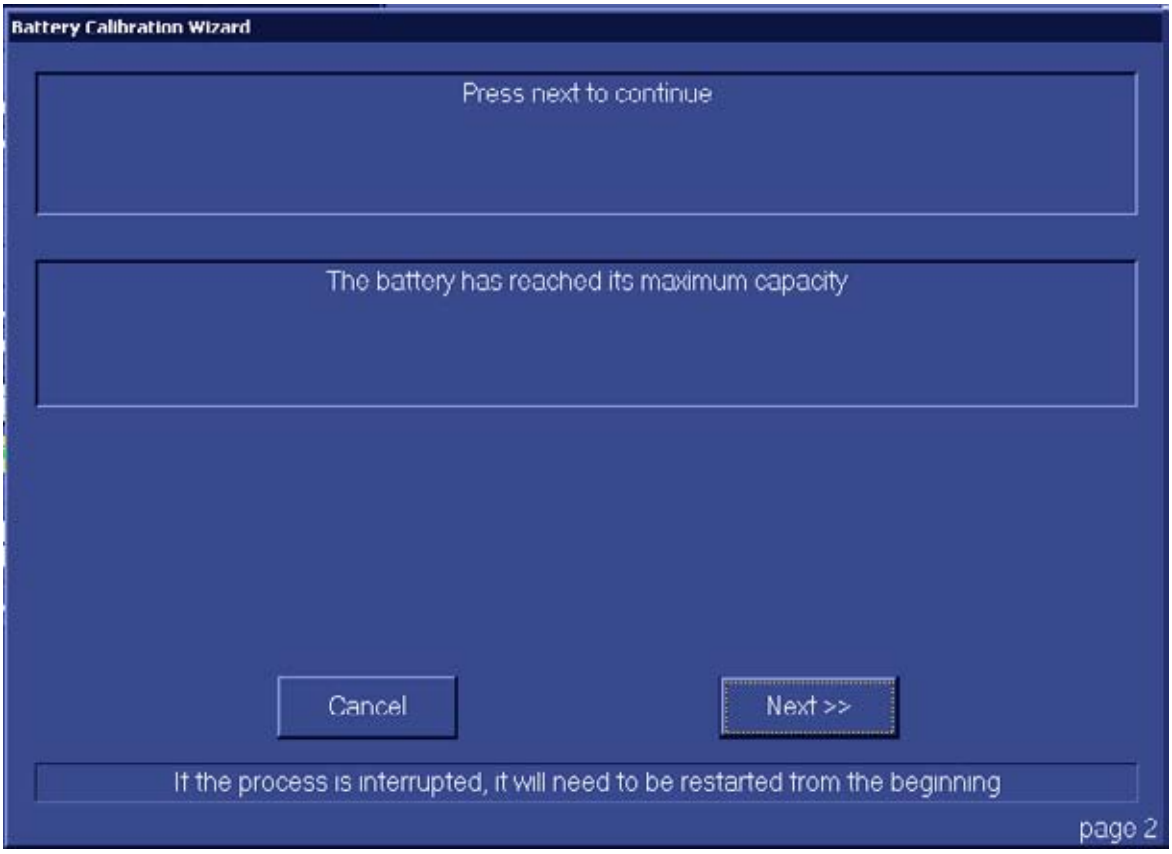

Battery Calibration Wizard
Press next to continue
The battery has reached its maximum capacity
Cancel
Next >>
If the process is interrupted, it will need to be restarted from the beginning
page 2

Figure 6-8 Battery Calibration Wizard - Page 2

4.) Click **Next**.

The Battery Calibration Wizard (Page 3) opens - see Figure 6-9 on page 6-8.

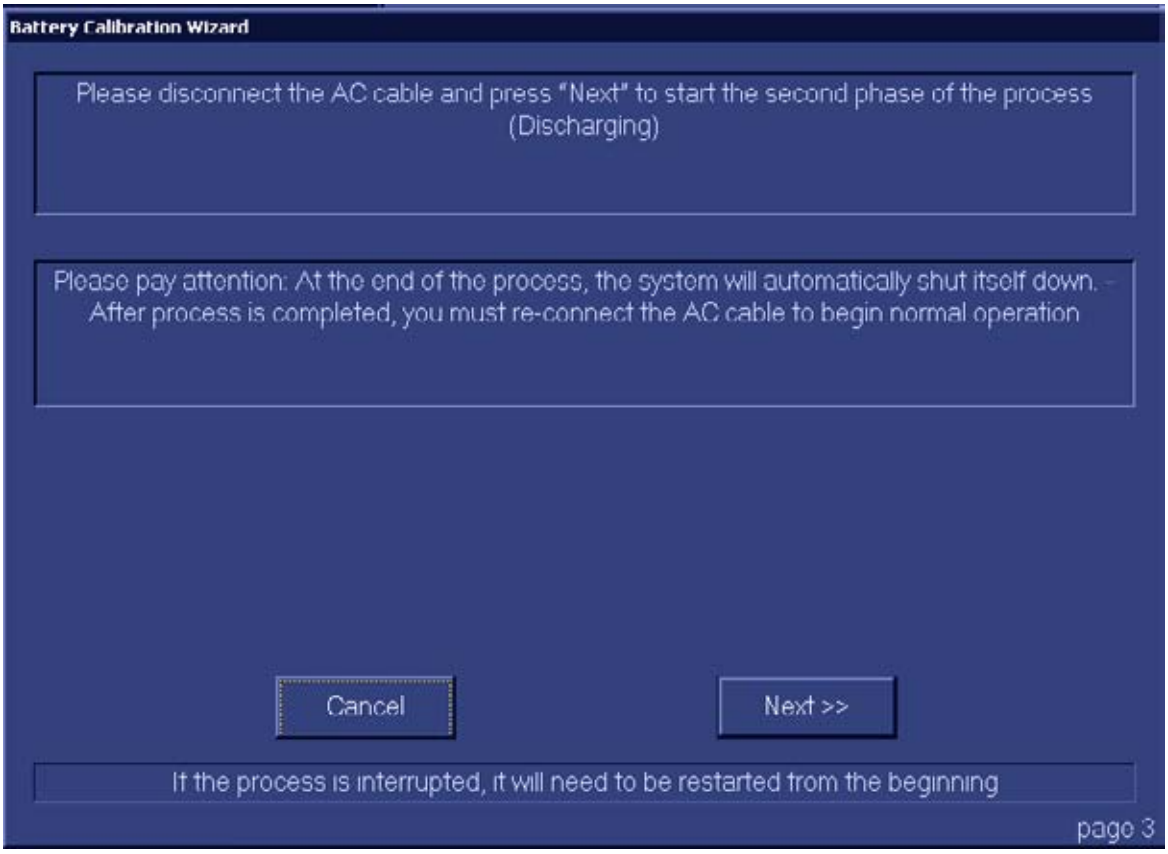

Battery Calibration Wizard
Please disconnect the AC cable and press "Next" to start the second phase of the process
(Discharging)
Please pay attention: At the end of the process, the system will automatically shut itself down.
After process is completed, you must re-connect the AC cable to begin normal operation
Cancel
Next >>
If the process is interrupted, it will need to be restarted from the beginning
page 3

Figure 6-9 Battery Calibration Wizard - Page 3

5.) Disconnect the AC power cable from the Vivid-i™/ Vivid-q™, then click **Next**.

The second phase of the process (Full Discharge) commences and the Battery Calibration Wizard (Page 3) is displayed as shown in Figure 6-10 on page 6-9.

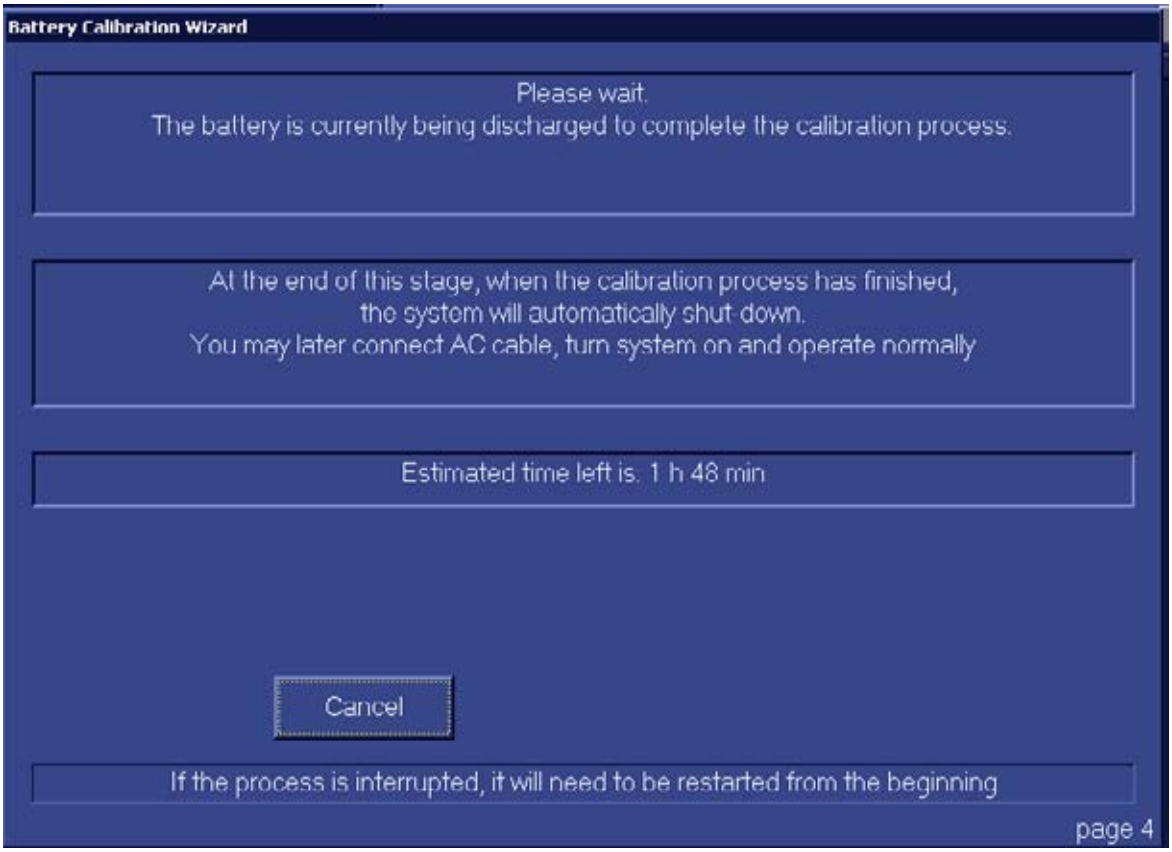

Battery Calibration Wizard
Please wait.
The battery is currently being discharged to complete the calibration process.
At the end of this stage, when the calibration process has finished,
the system will automatically shut down.
You may later connect AC cable, turn system on and operate normally
Estimated time left is. 1 h 48 min
Cancel
If the process is interrupted, it will need to be restarted from the beginning
page 4

Figure 6-10 Battery Calibration Wizard - Page 3

6.) Leave the system overnight to complete the Full Discharge process.

The Vivid-i™/ Vivid-q™ system automatically shuts down at the end of this process; the battery calibration procedure is now complete.

7.) The following morning, re-connect the AC power cable and turn ON power to the system.

Note: The system may now be used normally, without any dependence on battery capacity status.

Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of Chapter

This chapter describes how to set up and run diagnostic tools to locate system problems and failures. The Vivid-i™/ Vivid-q™ ultrasound unit includes built-in diagnostic tools that can be accessed from the scanner application.

Table 7-1 Contents in Chapter 7

Section	Description	Page Number
7-1	Overview	7-1
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Section 7-2
Diagnostics

7-2-1 Diagnostic Tools

The diagnostic tools are provided for checking the system which includes the power supply, temperature, fan operation, board functions, Back-end signal processing performance, keyboard operation, peripherals, and so on.

7-2-2 Diagnostic Procedure Summary

The diagnostic tools are used to identify and correct problems, as follows:

- When the system boots up, it loads all the required drivers and establishes communication with the Front Board, via the PCI bus. Check the system presets to verify that good unit performance can be achieved.
- When the Back End is operating, you can verify proper voltages and temperatures in the Front End and in the Power Supply. To check the Front End parts, the tests must follow a logical sequence, in order to identify the faulty component. For example, testing communication between the Front End and the Back End begins by testing the RFI board and the PCI bus, before testing all the other boards, *in the following sequence* (as applicable):
    * RFI board, TR32 boards, Probe and MUX board
- Many error messages are displayed due to minor changes in calibration that may occur during normal operation. Before performing diagnostic tests, perform calibration, as described in the *DC Offset Calibration* section, page 7-25. If error messages are displayed after performing calibration, perform the Front End diagnostics described in Performing Front End (FE) Diagnostics on page 7 - 24.

7-2-3 Accessing the Diagnostic Test Window

The diagnostic tools are accessed from 2D-Mode by simultaneously pressing **<ALT+Config>** on the alphanumeric keyboard. The *Diagnostic Test* window is displayed, as shown below:

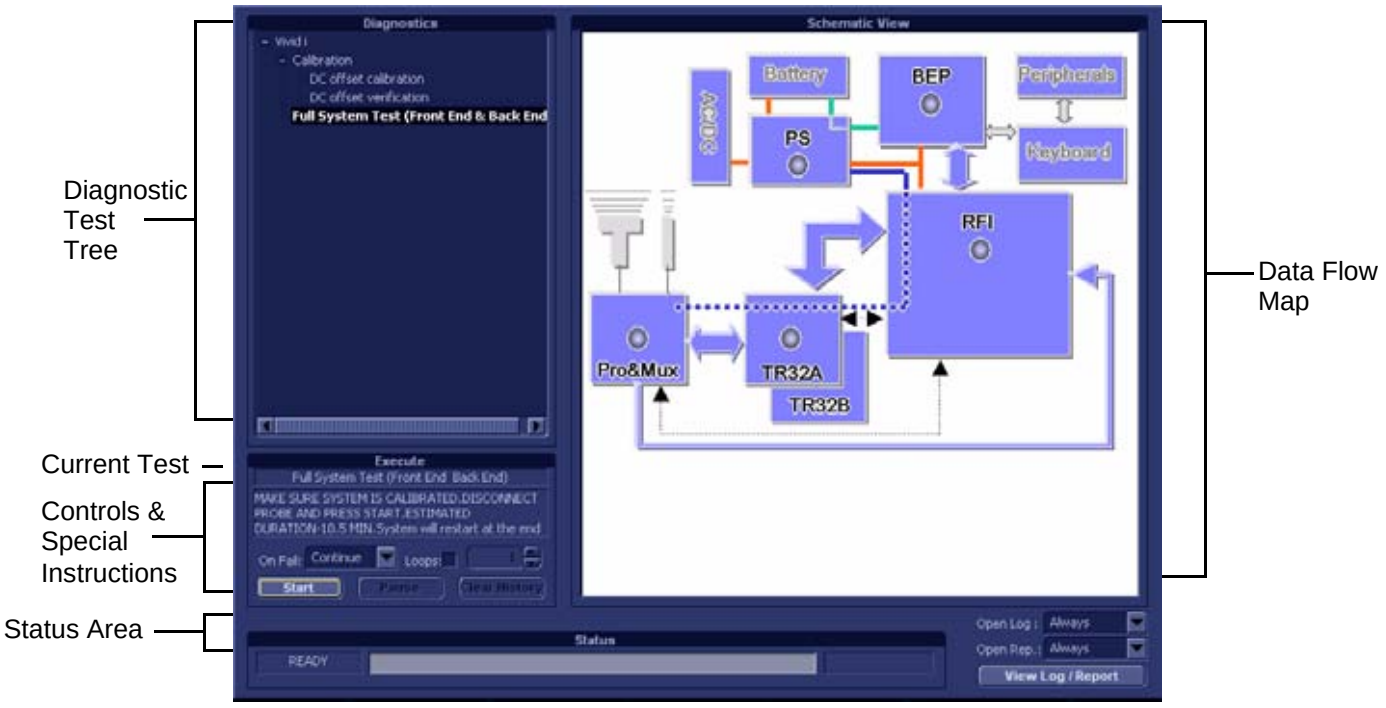


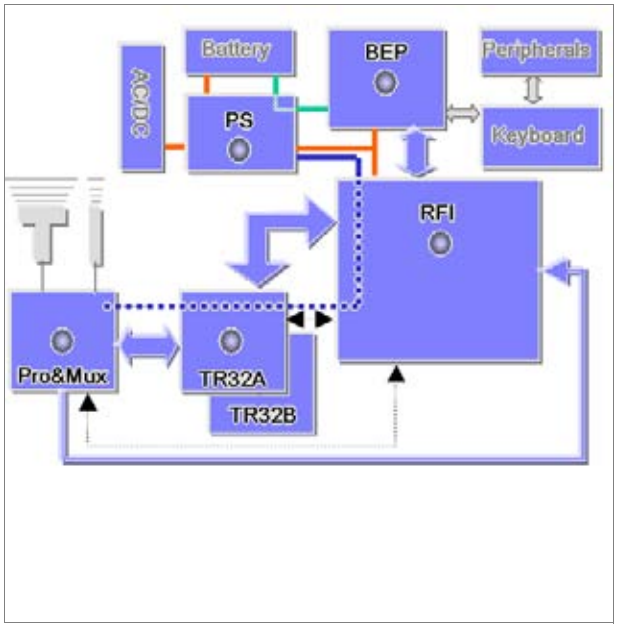
Figure 7-1 Diagnostic Test Window

NOTICE

IMPORTANT - The user-friendly Diagnostic Test Window displays dynamically-updated information. The Data Flow Map area on the right is designed to provide an instant visual representation of the system components; the color illumination of graphic buttons (light blue; light gray) and status indicators (green; red; yellow) indicates which component, or set of components, is currently undergoing diagnostic testing (see the examples in Figure 7-2 on page 7-4).

In this way, it is easy to visually follow the test sequence and progress of a specific test.
For a detailed explanation of the Diagnostic Test Window, refer to Table 7-2 on page 7-5.

Full System Test (Front End and Back End)



RX Test (TR32A and TR32B Boards)

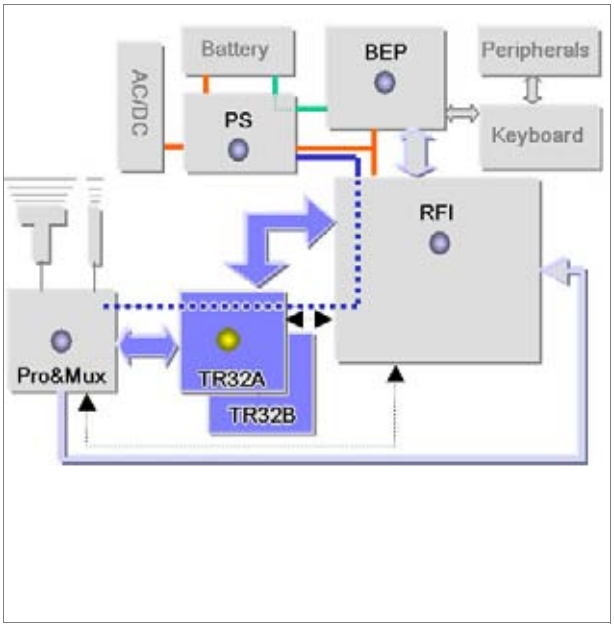


Figure 7-2 Data Flow Map - Graphic Color Illumination of Test-Specific Components and Status Indicators

Note: For a summary of the various Diagnostic Test Menu options, together with details of the information displayed in different areas of the screen, see Table 7-2 on page 7-4 and *Diagnostic Test Window Menu Options* section, on page 7-10.

Note: When performing a specific test for an intermittent problem, it is highly recommended to use the Loop option (use the combo box or type the required number of loops) as appropriate. Looping the test will assist in detecting the problem.

Note: Once the test has been completed, a log can be viewed, as described in the *View Log* section, on page 7-6.

The *Diagnostics Test Window* (Figure 7-1) comprises the following areas and menu options:

Table 7-2 Vivid-i™/ Vivid-q™ Diagnostics Test Window and Menu Options

Option	Description	Comments
Data Flow Map	Displays a schematic view of the Vivid-i™/ Vivid-q™ data flow (Data Flow map). The functionality of each button in this area corresponds to that of the test of the same name in the Diagnostic Test Tree. You are able to select and perform the Vivid-i™/ Vivid-q™ diagnostic tests by trackballing to the required test (listed in the Diagnostic Test Tree) and pressing **Set**. Note: Double-clicking a button in the Data Flow Map expands the corresponding list of tests (in the Diagnostic Test Tree) available for that component (or group of components).	In the Data Flow map Status Window, status indicators are highlighted by color, indicating the following: • **Light Blue:** The selected test will be performed on this component, or group of components. • **Light Gray:** This component, or group of components will be *excluded* from the test/s. • **Green:** All recommended tests for these components have been completed and no problems were identified. • **Red:** At least one problem was identified in these components during the performance of the test. • **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.
Diagnostic Test Tree	Displays a menu of diagnostic test sequences and tests available for selection.	
Execute	Displays the name of the currently-selected diagnostic test (or test sequence).	
Controls and Special Instructions	Displays any special instructions for checks required before performing the test. For example, *Make sure system is calibrated. Disconnect probe and press **Start***.	The area also includes these controls: • a **Start/Stop** button used to commence a test. After pressing Start, the button may be used to stop a test before completion. • a **Pause** button used to pause a test before resuming. • a **Clear History** button used to clear the highlighted status indication in the Data Flow map (schematic view). Note: this button is not used to clear the test sequence log files (refer to Clear Log button in Table 7-3 on page 7-6). • an **On Fail** combo box - used to select the action required in the event that the test fails (Stop or Continue**)**. • a **Loops** checkbox. If activated, the test will be repeated for the selected number of loops.
Status Area	Displays instructions during the test, as well as test status and result messages.	The following messages are displayed: • **Test status:** For example, **Ready for test, Executing,** or **Finished.** • **Instructions:** During the course of a diagnostic test, any instructions to the user are displayed in the Status area. For example, **Wait.** • **Test results:** For example, **Passed** or **Failed**. The area also includes two progress bars: • **Progress bar:** Shows progress of an individual test (within a sequence of tests). The area also includes: • a **View Log** button used to review the test results. (Enabled only after test execution). Refer to *View Log* section, on page 7-6.

7-2-3-1 View Log

From the *Diagnostics Test Window* (Figure 7-1) the View Log button provides access to the test result information described below.This is shown in the View Log dialog box (see example in Figure 7-3 below) which is displayed in the *upper* right portion of the screen (over the Data Flow Map area).

Table 7-3 Vivid-i™/ Vivid-q™ Diagnostics Test Window - View Log

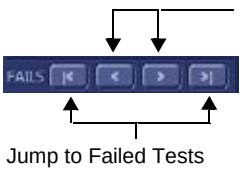
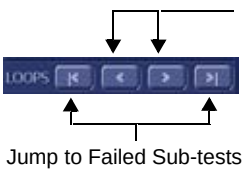
Option	Description	Comments
File	Log file number	
Date	Date test was performed.	
Time	Time test was executed.	
Log File Scroll Bar and Arrows	Enables scrolling through the list of Log Files	
Tests	Displays test sequence log files. Shows a list of the specific diagnostic test/s included in the currently-selected test sequence.	
Result	Lists test results as either PASS or FAIL.	
Loop	Lists name of loop and the sub-tests within the loop	
Date	Date test was performed.	
Tests Scroll Bar and Arrows	Enables scrolling through the list of Test Log Files.	A test sequence may have up to four reports. Since only one specific test may have failed, the scroll arrows enable jumping directly from one Failed test to the next (i.e., failures only). Alternatively, you can scroll through all the tests (one-by-one). 
Loops Scroll Bar and Arrows	Enables scrolling through the Loops and sub-tests.	A test may have many loops, each of which may have sub-tests. Since only one specific sub-test may have failed, the scroll arrows enable jumping directly from one Failed sub-test to the next (i.e., failures only). Alternatively, you can scroll through all the loops (one-by-one). 

Table 7-3 Vivid-i™/ Vivid-q™ Diagnostics Test Window - View Log

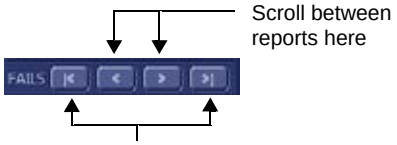
Option	Description	Comments
Reports	Displays the specific report (or list of reports) for the currently-selected test sequence. (shows all OK and failed tests) Certain tests will have more than one report (see the example in Figure 7-3 below).	Double-clicking on a currently-selected report displays that report in the Report window (lower portion of the View Log dialog box) - refer to Figure 7-4 below.
Reports Scroll Bar and Arrows	Enables scrolling through the list of Reports	A test sequence may have up to four reports. Since only one specific test may have failed, the scroll arrows enable jumping directly from one Failed test report to the next (i.e., failures only). Alternatively, you can scroll through all the reports (one-by-one). 
Erase Button	Clears all test sequence log files for that specific (currently selected) test listed in the Tests window (passed and failed tests).	It is *not recommended* to clear the test sequence log files unless a test failed due to user intervention or as a result of a false alarm. (It is necessary to erase each log file separately).
Exit Button	Closes the *View Log* dialog box	Returns to the Diagnostic Test window.
Report Window	Lower portion of the View Log dialog box where the the currently-selected report is displayed in a separate window (see the example in Figure 7-3). The displayed *Average*, *Deviation*, *Max* and *Min* values are dynamically updated.	Visible only after test execution.
Report window Scroll Arrows	Enables scrolling through all channels. Displays the currently-selected channel number. For example, Count: 64	
Close Button	Closes the Report window.	

Figure 7-3 View Log Dialog Box

In Figure 7-3 above, the selected report (Test signal amplitude, first harmonic) is displayed in the Report window. When there is more than one report listed, the first report is displayed (by default).

Double-clicking on another report (for example, Test signal amplitude second harmonic), will evoke the display of that report in the Report window as shown in the example in Figure 7-4 below.

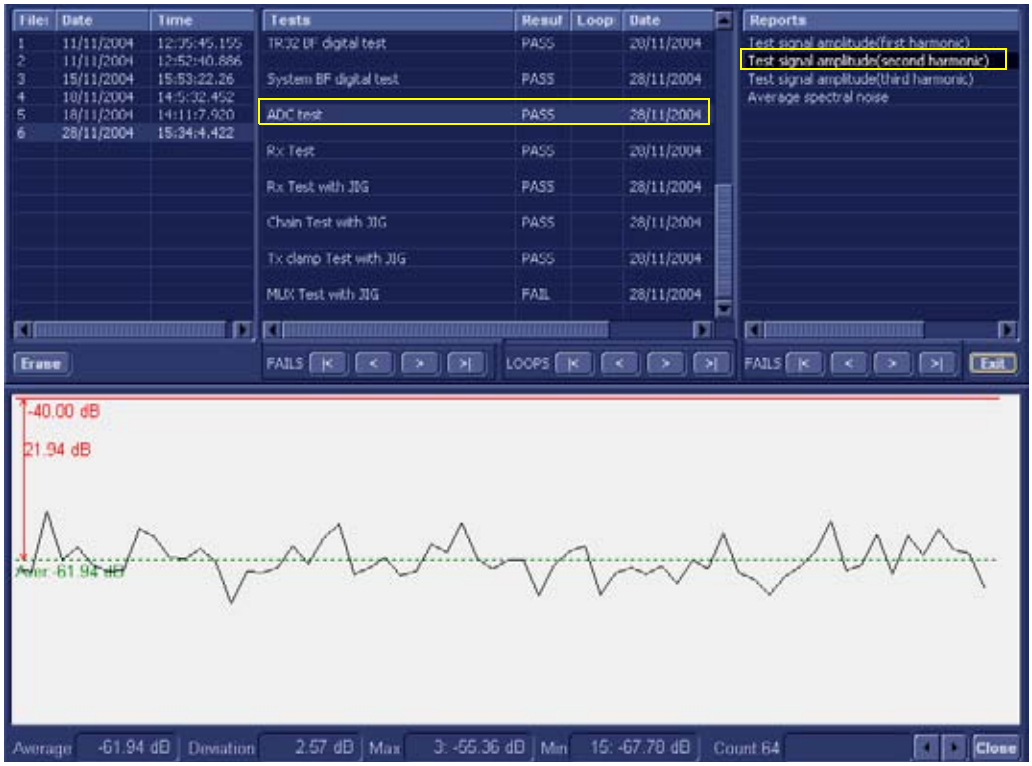


Figure 7-4 ADC Test - Viewing Report (Test Signal Amplitude 2nd Harmonic)

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-4.

7-2-4 Diagnostic Test Window Menu Options

The *Diagnostic Test* menu includes the options described below.

7-2-4-1 Full System Test

NOTE: The Full System Test requires approximately 10 minutes for completion.

7-2-4-1-1 Full System Test (FE and BEP)

Performs a full sequence of complete Front End and Back End tests (automatically) that do not require user intervention. This is particularly recommended for detecting problems that are intermittent in nature, since a test may be paused at any stage and any detected failures reviewed.

For test procedure instructions, see the *Full System Test (FE and BEP)* section, on page 7-20.

7-2-4-2 Front End Tests

NOTE: The Front End Tests may be performed in any order. However, due to the functional dependencies between each of the Front End boards, it is recommended to perform the tests on the boards in the following order (as described in the Performing Front End (FE) Diagnostics section, on page 7-24):

1.) RFI board
2.) TR32 boards
3.) PM board

Performing the tests in the proper sequence will help to derive the correct conclusions regarding the source of the problem.

7-2-4-2-1 Calibration

- **DC Offset Calibration**

  This is used to test proper operation of the Beamformer, and TR32A and TR32B boards. The test generates no signal at the input to the Beamformer and is used to calibrate the system, or to test system calibration in order to check that the current calibration values are valid for the current environment.
  For test procedure instructions, see the *DC Offset Calibration* section, page 7-25.

- **DC Offset Verification**

  This test verifies that the calibration saved on the Hard Disk is within acceptable limits.
  For test procedure instructions, see the *DC Offset Verification* section, page 7-28.

7-2-4-2-2 RFI Tests

- **Full RFI Test**

  The Full RFI Test performs a complete test sequence and includes all the RFI board tests (described below).
  For test procedure instructions, see the *Full RFI Test* section, page 7-31.

- **RFI FE Cache Test**

  Tests the cache memory. (The cache memory for the PM, TR32A, TR32B and the RFI boards is located on the RFI board). This test sends a specific pattern into the cache memory and the expected result is to see a predefined pattern as the output from the cache memory.
  For test procedure instructions, see the *RFI FE Cache Test* section, page 7-34.

- **RFI Analog Circuits Test**

  This tests the RFI analog circuitry (which is responsible for temperature monitoring and communication with the TEE probe).
  For test procedure instructions, see the *RFI Analog Circuits Test* section, page 7-37.

- **RFI Demodulator Short Test**

  This is used to perform a short digital test on the demodulator to make sure that the demodulator on the FPGA is functioning in accordance with the specifications.
  For test procedure instructions, see the *RFI Demodulator Short Test* section, page 7-40.

- **RFI Audio Test**

  This tests the audio frequency for Doppler sound (coming from the RFI board to the Back End). During this test - approximately midway on the progress bar - a loud, high-pitched sound will be heard coming from the speakers.
  For procedure details, see the *RFI Audio Test* section, page 7-43.

Note: To conduct a complete audio test of the system, it is also necessary to perform an audio test which is part of the Back End - for details, refer to the *PC Doctor* section, page 7-15.

7-2-4-2-3 TR32 Tests

- **Beamformer Tests**

  - **TR32 BF Digital Test**

    This is an internal test of the Beamformers. Each Beamformer generates an internal test pattern (first on the TR32A board and then on the TR32B board). This test pattern is generated through MLA0 and MLA1 to the RFI.

    Therefore, in the first phase of the test, the Beamformer on the TR32A board generates a test pattern signal (while TR32B generates pattern *zero*).

    In the second phase of the test, the Beamformer on the TR32A board generates a test pattern *zero* - while the BF on the TR32B board generates a test pattern signal.

    Both the test patterns are summed and focused on the BF 32A and generated to the RFI demodulator.

    For test procedure instructions, see the *TR32 BF Digital Test* section, page 7-46.

  - **System BF Digital Test**

    In this test, both Beamformers are generating internal test patterns. The patterns from the BF of the TR 32B board are summed and focused in the BF of the TR32A board. From here, the pattern is generated through MLA0 and MLA1 to the RFI.

    For test procedure instructions, see the *System BF Digital Test* section, page 7-49

  - **ADC Test**

    The ADC Test is used to check that 1st harmonic, 2nd harmonic, 3rd harmonic, and background noise are within pre-defined limits.

    In this test, a signal is generated from the RFI into the TR switches. For all 64 channels of the system, each signal goes through the following: pre-amplification, filtering, analog-to-digital conversion, and focusing. The test signal is at a frequency of 2 MHz.

    For test procedure instructions, see the *ADC Test* section, page 7-52.

- **Receive (RX) Tests**

  - **RX Test**

    The RX Test is performed with no probe connected. This is used to check that the signal values at the input to the TR32 board are as expected.

    When performing the RX Test, test signals are generated from the RFI, and the results are expected to be of fairly high amplitudes with no distortion of the frequency.

    For test procedure instructions, see the *RX Test* section, page 7-57.

7-2-4-2-4 PM Tests

- **ACW Test**

  - **ACW IQ Symmetry Test**

    The ACW (analog CW test) is performed when CW problems are suspected. Checks the symmetry of I and Q signals. Inputs a test signal shifted from the mixer frequency, then calculates the RMS of the I and Q vectors and compares them. The RMS vectors should be lower than the defined limits (shown on the report).

    For test procedure instructions, see the *ACW IQ Symmetry Test* section, page 7-61.

- **ACW Matrix Test**

  The ACW (Analog CW) Matrix Test checks the path of all 32 RX channels to all VCA outputs on the TR32B board. A test signal shifted from the mixer frequency is generated and the receive signal amplitude and frequency is then checked. The frequency should be matched to the frequency shift of the input signal (shown on the Test report).

  For test procedure instructions, see the *ACW Matrix Test* section, page 7-65.

- **ACW Delay Range Test**

  The ACW (Analog CW) Delay Range Test checks the path of VCA outputs to the Delay taps in all three frequency ranges. The expected results are shown on the Test report.

  For test procedure instructions, see the *ACW Delay Range Test* section, page 7-69.

- **ACW Pre-Mixer Gain Test**

  The ACW (Analog CW) Pre-Mixer Gain Test checks the PM Gain level. A test signal shifted from the mixer frequency is generated and the test compares the 0db RMS to the levels of the other Gains. The RMS level is expected to be lower than the selected Gain level (as shown on the Test report).

  For test procedure instructions, see the *ACW Pre-Mixer Gain Test* section, page 7-73.

- **ACW BPF Test**

  The ACW (Analog CW) BPF Test is used to check the operation of all the Bend Pass filters. A test signal is shifted from the mixer frequency and then the test checks the filter response. Attenuation of the filters in different frequencies should be within pre-defined limits (shown on the Test report).

  For test procedure instructions, see the *ACW BPF Test* section, page 7-76.

- **ACW HPF Test**

  The ACW (Analog CW) HPF Test is used to check the operation of the High Pass Filters (300Hz and 600 Hz). A test signal is shifted from the mixer frequency and then the test checks the filter response. Attenuation of the filters in different frequencies should be within pre-defined limits (shown on the Test report).

  For test procedure instructions, see the *ACW HPF Test* section, page 7-81.

• **Pencil Test**

- **Pencil Rx Test**

  When performing the Pencil Rx Test, no probes or jig are connected to the system.

  This test is performed to check the receive functions. During this test, signals are transmitted through the circuitry. The received frequency should match the transmitted test frequency, as shown in the Test report.

  For test procedure instructions, see the *Pencil Rx Test* section, page 7-84.

7-2-4-3 Monitoring Tests

7-2-4-3-1 Full System Monitoring Test

The Full System Monitoring Test performs a full sequence of all monitoring tests (as described below).

For test procedure instructions, see the *Full System Monitoring Test* section, page 7-87.

7-2-4-3-2 Fixed Voltages Test

The Fixed Voltages Test is used to check the Power Supply unit and to ensure that voltages are within the pre-defined limits.

For test procedure instructions, see the *Fixed Voltages Test* section, page 7-94.

7-2-4-3-3 Temperatures Test

The Temperatures Test is used to check the temperature of the Front End and the Back End. The test reads all the temperature sensors in the system to ensure that the system is operating within the pre-defined temperature limits and that there is no overheating of any components.

For test procedure instructions, see the *Temperatures Test* section, page 7-97.

7-2-4-3-4 Fans Speed Test

The Fans Speed Monitoring Test is used to check that the Fan Controller is fully operational and that all five fans operate simultaneously (at the pre-defined speed) to maintain proper cooling and the optimum operating temperature of all Vivid-i™/ Vivid-q™ system components.

For test procedure instructions, see the *Fans Speed Test* section, page 7-100.

7-2-4-3-5 Battery Parameters Test

The Battery Parameters Test is used to check the battery status with regard to the following:

- Battery capacity
- Charging voltage being supplied to the battery (or the voltage being supplied by the battery)
- Source of the power being provided to the system (i.e. external power via the AC/DC or via the battery [indicating the battery is either being charged or discharged]).

For test procedure instructions, see the *Battery Parameters Test* section, page 7-103.

7-2-4-3-6 Tx Voltages Test

The TX Voltages Test is used to test the transmit part of the power supply to make sure that the Tx voltage is within expected values.

For test procedure instructions, see the *Tx Voltages Test* section, page 7-106.

7-2-4-4 BEP Tests

The BEP Tests are performed to check of the various Back End hardware components, as outlined below. The procedures are described in detail in the *Performing Back End Diagnostics on the System* section, on page 7-109.

7-2-4-4-1 Extended Keyboard Test

The Extended Keyboard Test is used to check proper operation of the External Keyboard components (backlighting, keys, ATGC sliders, *etc*.)

For test procedure instructions, see the *Extended Keyboard Test* section, page 7-109.

NOTE: For instructions on performing the alphanumeric keyboard test, refer to Alphanumeric Keyboard Test on page 4 - 19.

7-2-4-4-2 ECG Test

The ECG Test is used to check proper operation of the ECG module, checking the output of the ECG and Phono options and testing for any noise introduction into the ECG signal.

For test procedure instructions, see the *ECG Test* section, page 7-113.

7-2-4-4-3 PC Doctor

The PC Doctor Tests are divided into two main groups: *Automatic* and *Interactive.* The automatic tests do not require user intervention. The procedure instructions for both groups are provided in the *PC Doctor* section, page 7-116.

- **Automatic**

  - **Full Back End Test without Hard Disk**

    This test performs a full system check without a Hard Disk scan. The test sequence includes all automatic tests (excluding the Hard Disk).

    For test procedure instructions, see the *Full Back End Test w/o Hard Disk Scan* section, page 7-116.

  - **Full PC Doctor Test (50 min)**

    The Full PC Doctor Test requires 50 mins (longer than the Full Test without Hard Drive). This test performs a full system check as well as a Hard Disk scan. The test sequence includes all automatic tests (including the Hard Disk).

    For test procedure instructions, see the *Full PC Doctor Test (50 min)* section, page 7-118.

  - **CPU Tests**

    The CPU Tests are used to perform a variety of CPU checks, as described below.

    For test procedure instructions, see the *CPU Tests* section, page 7-120

    - **CPU Full Test:** Performs a battery of tests on the CPU to ensure that it is working properly. All the remaining tests are performed as part of the CPU Test.
    - **CPU Registers:** Tests the CPU Registers using the default test patterns. On 32 bit CPUs, the extended registers are also checked. If errors are detected, the failed registers are listed.
    - **CPU Arithmetics:** Tests the proper function of the arithmetic commands ADC, ADD, DEC, DIV, IDIV, IMUL, INC, MUL, SBB and SUB with 16 and 32 bit operands. If errors are detected, the failed commands and operands are listed.

- **CPU String Operations:** Tests the proper operation of the string commands LODS, MOVS, SCAS and STOS with 8, 16 and 32 bit operands. If errors are detected, the failed commands and operands are listed.
- **CPU Logical Operations:** Tests the proper operation of the logical operations AND, NOT, OR and XOR with 16 and 32 bit operands. If errors are detected, the failed operands are listed.
- **CPU Math Registers:** Tests the coprocessor register stack, pointers and commands FLDLZ, FLDPI, FLDLN2, FLDLG2M FLDL2T FLDL2E and FLD1. If errors are detected, the failed steps and commands are listed.
- **CPU Math Commands:** Tests the coprocessor commands FBLD/FBSTP, FLD/FST, FXCH, FCOM, FICOM, FTST, FXAM and FUCOM. If errors are detected, the failed instructions are listed.
- **CPU Transcendental:** Tests the coprocessor transcendental commands F2XM1, FPATAN, FPTAN, FYL2XP1, FCOS, FSIN and FSINCOS. If errors are detected, the failed commands are listed.
- **CPU MMX Arithmetic:** Tests the MXX commands PADD, PSUB, PMUL and PMADD. If errors are detected, the failed commands are listed.
- **CPU MMX Logical:** Tests the MXX commands PAND, PANDN, POR and PXOR. If errors are detected, the failed commands are listed.
- **CPU MMX Shift:** Tests the MXX commands PSLL and PSRL. If errors are detected, the failed commands are listed.
- **CPU MMX Data Transfer:** Tests the MXX commands MOVD and MOVQ. If errors are detected, the failed commands are listed.
- **CPU MMX Misc.:** Tests the MXX commands PCMPEQ, PCMPGT, PACKSS, PACKUS and PUNPCK. If errors are detected, the failed commands are listed.

- **HD Test**

  The HD Tests are used to perform a variety of Hard Drive checks, as described below.

  For test procedure instructions, see the *HD Test* section, page 7-123.

  - **Hard Drive Full Test (w/o Scan):** Performs a battery of tests to examine the hard drive and ensure that it can perform all its functions. All the remaining tests are performed on the hard drive to ensure that the hard disk controller and the drive mechanism are working correctly. The disk surface itself is also checked. This test may take 3.5 minutes.
  - **Hard Drive Linear Seek:** Moves the hard disk drive heads from track 0 to the maximum track one track at a time.
  - **Hard Drive Funnel Seek:** Moves the hard disk drive heads in a funnel fashion (from the first track to the last, then to the second track, the second last track, the third track and so on).
  - **Hard Drive Surface Scan:** Scans the surface for defects on the hard disk drive.

- **Memory Test**

  The Memory Tests are used to perform a variety of memory checks, as described below.

  For test procedure instructions, see the *Memory Test* section, page 7-125.

  - **Full Memory Test:** Uses 18 test patterns to test memory locations. If errors are detected, the address of the block in which the error was detected is shown. During testing, these diagnostics will also look for parity errors and other exceptions. If encountered, these are added to the test log as errors.
  - **Memory Pattern Test:** Uses several test patterns to test as much memory as possible.
  - **Memory Parity Test:** Checks for parity errors on the memory bus during intensive string transfer operation. If an error is detected, the address of the failed block is displayed.

- **Video Test**

  The Video Tests are used to perform a variety of video diagnostic tests, as described below. These tests use 18 test patterns to fill the video buffer, testing your graphics acceleration and text output

  For test procedure instructions, see the *Video Test* section, page 7-127.

  - **Full Video Test:** Test the system's video capabilities. This involves testing the memory, testing the graphics acceleration and testing the text output. You can follow the tests being performed on the monitor. This test can be cancelled at any time by pressing **<Esc>** on the keyboard.
  - **Video Memory:** Tests the video memory by filling the video buffer with 18 test patterns, one pattern at a time. These tests fill the entire screen with a single color.
  - **Video Data Transfer:** Tests the graphics acceleration part of the video controller. This test fills the screen with black and white concentric squares, and rectangles of various sizes and colors. If errors are detected, the locations of the problems are displayed.
  - **Video Text Output:** Prints a text string in random sizes and colors to test the video device driver and video controller.

- **PCI Test**

  A Peripheral Component Interconnect (PCI) bus is a fast standard bus that is common in Pentium systems. The PCI Test is performed to ensure that the PCI bus is working up to speed. The motherboard is scanned to verify the configuration space and to ensure that the diagnostics can communicate with the board.

  For test procedure instructions, see the *PCI Test* section, page 7-129.

- **Network Test**

  A Network Interface Card (NIC) is a computer circuit board or card that is installed in a computer so that it can be connected to a network. Networks are used by businesses and some home users to connect PCs together so that they can share files and resources. Data travels over a network connection much faster than over standard internet connections.

  The PC Doctor Network Test will reveal that a network card is present without a driver installed. These cards are likely to not show up on a PC's list of network cards available for test. This may cause the test to return a result of "not applicable", meaning no network cards were found. The test may detect other issues such as electrical interference (noise), circuitry damage, loose connectors, and crimped or bad network cables.

The Network Test will test DSL or cable internet connections, which operate within a network environment. However, this test does not test the DSL or cable modem used for accessing the Internet. Currently, no PC-Doctor test exists for testing cable or DSL modems.

The Network Communications Test checks if your PC's network card works and if your PC properly communicates over a network. It makes a list of all the remote PCs on the network that the NIC uses and sends information in the form of several "data packets" from the tested PC to the "host" PCs. These "data packets" are then returned by the "host" PCs to the tested PC where the contents of the "data packet" are checked. If too many of the "data packets" fail to get returned or are thrown away because of data corruption, the Network test logs as FAILED.

For test procedure instructions, see the *Network Test* section, page 7-131.

- **Interactive**
  - **Audio Test**

    The Audio Test is performed to check for proper operation of the audio system; the following selections are available: *Left Channel*, *Right Channel*, *Both Channels,* and *MIDI*.

    For test procedure instructions, see the *Audio Test* section, page 7-133.

  - **Monitor Test**

    The Monitor Test is used to perform a variety of monitor diagnostic tests, as described below.

    - **Combination Test:** Checks the monitor alignment, color depth and monitor resolution. Four cross hairs are placed in each corner of the screen, as well as RGB spectrum arrays and horizontal and vertical alignment bars.
    - **Solid Color Test:** Tests the panel display on laptops and LCD screens. This test display a solid color on the screen to ensure that all the color pixels are operating correctly.
    - **VESA (Video Electronics Standards Association) Test Patterns:** Checks luminance, geometry and focus. These tests are designed for professional measurement use.

    For test procedure instructions, see the *Monitor Test* section, page 7-135.

Section 7-3
Performing Full System Diagnostics

When performing the automatic Full System Diagnostic tests, it is strongly recommended to start with the **Full System Test (FE and BEP)** - especially if the Vivid-i™/ Vivid-q™ system shows signs of an intermittent problem. As described in this section, the testing sequence can be paused and restarted at any stage, providing a quick and easy method of reviewing any detected faults.

The different types of Full System Diagnostic Tests are described in detail in the *Diagnostic Test Window Menu Options* section, on page 7-10. For instructions on performing each of these tests, refer to the following information:

- Full System Test (FE and BEP) on page 7 - 20

7-3-1 Accessing the Full System Diagnostic Options

- In 2D-Mode, press **<ALT +Config>** on the alphanumeric keyboard. The *Diagnostic Test* window is displayed, as shown in (Figure 7-1).

7-3-1-1 Full System Test (FE and BEP)

NOTE: For a description of this test, refer to the Full System Test (FE and BEP) on page 7 - 10.

NOTE: The Full System Test (FE and BEP) performs a full sequence of complete system tests (automatically) and requires approximately 10 minutes for completion.

1.) In the *Diagnostic Test* window, trackball to **Full System Test (FE and BEP)** in the list of tests available for selection from the Diagnostic Test Tree (see Figure 7-5 below) and press **Set**. The Full System Test (FE and BEP) name is displayed under *Execute*, and all system components are highlighted blue in the Schematic View, as shown below:

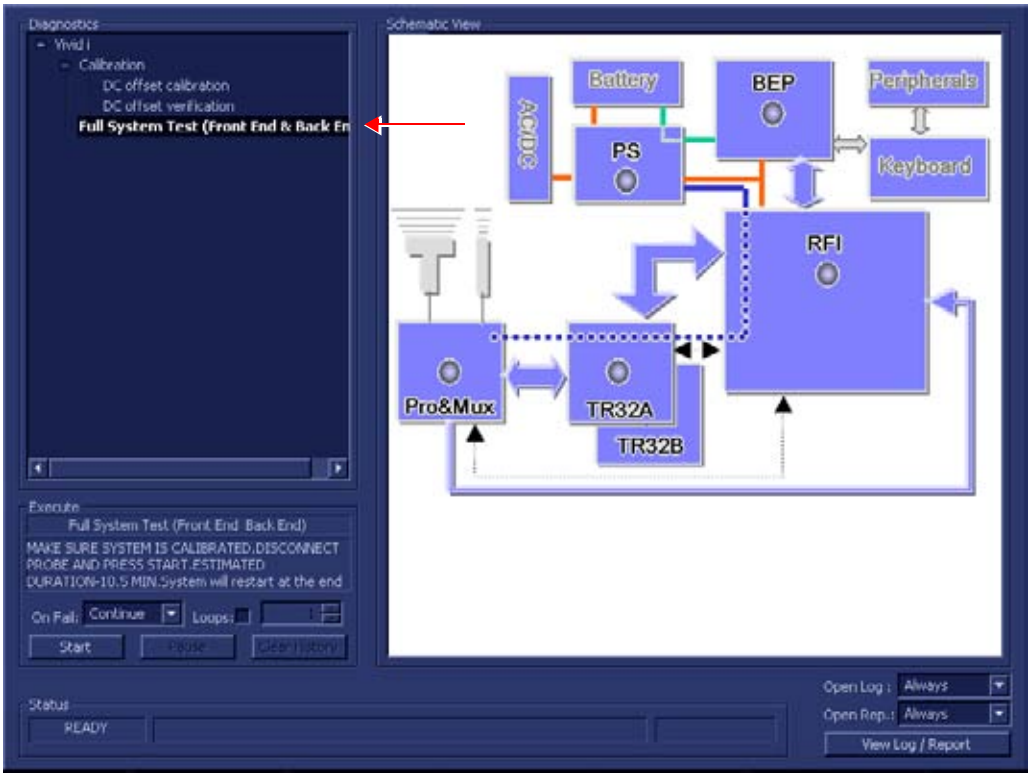


Figure 7-5 Full System (FE and BEP) Test

2.) As indicated in the *Special Instructions* area, make sure the system is calibrated and disconnect any probe currently connected to the system.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Automatic Test Sequence commences. While the sequence of automatic testing or the group of tests proceeds, the name of the test currently in progress (Full System Test FE and BEP) is

displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bars in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full System Test (FE and BEP) sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-6.

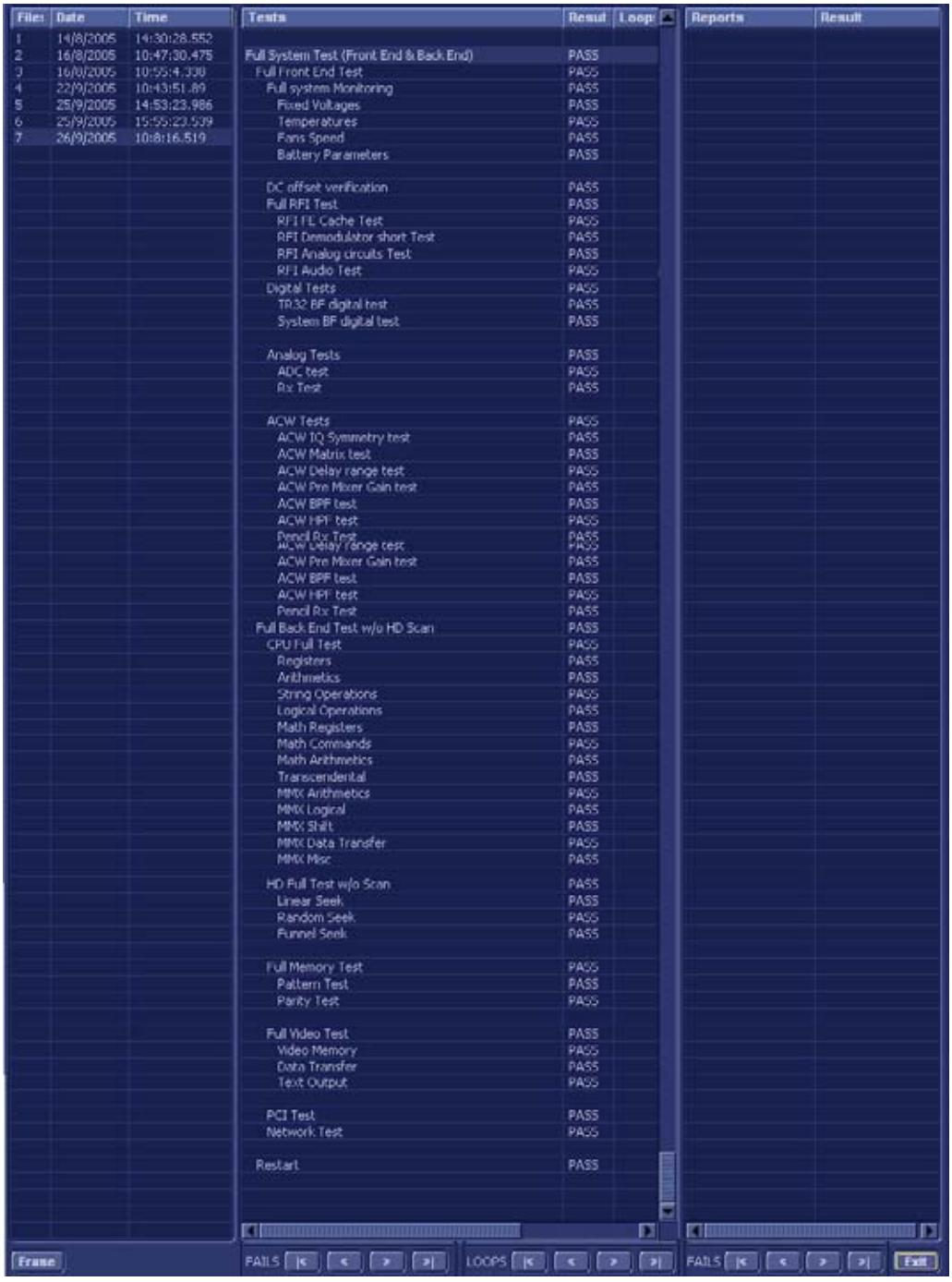


Figure 7-6 View Test Log - Full System Test (BEP and FE)

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE Medical Systems On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-4
Performing Front End (FE) Diagnostics

*NOTE: When performing Front End Diagnostic tests, it is strongly recommended to start with the **Full System Test (FE and BEP)** especially if the system shows signs of an intermittent problem. (For details, see Full System Test (FE and BEP) on page 7 - 20).*

The Front End diagnostic tests can be initiated manually and may be performed in any order. However, due to the functional dependencies between each of the Front End boards, it is recommended to perform the tests on the boards in the following order:

1.) RFI board

2.) TR32 boards

3.) PM board

Performing the tests in the proper sequence will help to derive the correct conclusions regarding the source of the problem.

As described in this section, the testing sequence can be paused and restarted at any stage, providing a quick and easy method of reviewing any detected faults. For instructions on performing a specific test, refer to the relevant test in the appropriate sub-sections:

- **Calibration Tests**, as described in the *Calibration Tests* section, on page 7-25.
- **RFI Diagnostic Tests**, as described in the *Radio Frequency Interface (RFI) Diagnostic Tests* section, on page 7-31.
- **TR 32 Diagnostic Tests**, as described in the *TR 32 Diagnostic Tests* section, on page 7-46.
- **Probe & MUX Diagnostic Tests**, as described in the *Probe and MUX Diagnostic Tests* section, on page 7-61.

NOTE: If the system must be re-booted, do so. Continue testing from the point at which you were required to reboot. If a failure occurs, re-boot the system and test again to verify the outcome of the test.

7-4-1 Accessing the Front End Diagnostic Options

- In 2D-Mode, press **<ALT +Config>** on the alphanumeric keyboard. The *Diagnostic Test* window is displayed, as shown in (Figure 7-1).

7-4-2 Calibration Tests

7-4-2-1 DC Offset Calibration

NOTE: For a description of this test, refer to the information provided in DC Offset Calibration on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **DC Offset Calibration** in the list of *Front End* tests available for selection from the Diagnostic Test Tree (see Figure 7-7 below) and press **Set**. The DC Offset Calibration name is displayed under *Execute;* the relevant system components to be tested (in this case, all components) are highlighted light blue in the Schematic View as shown below:

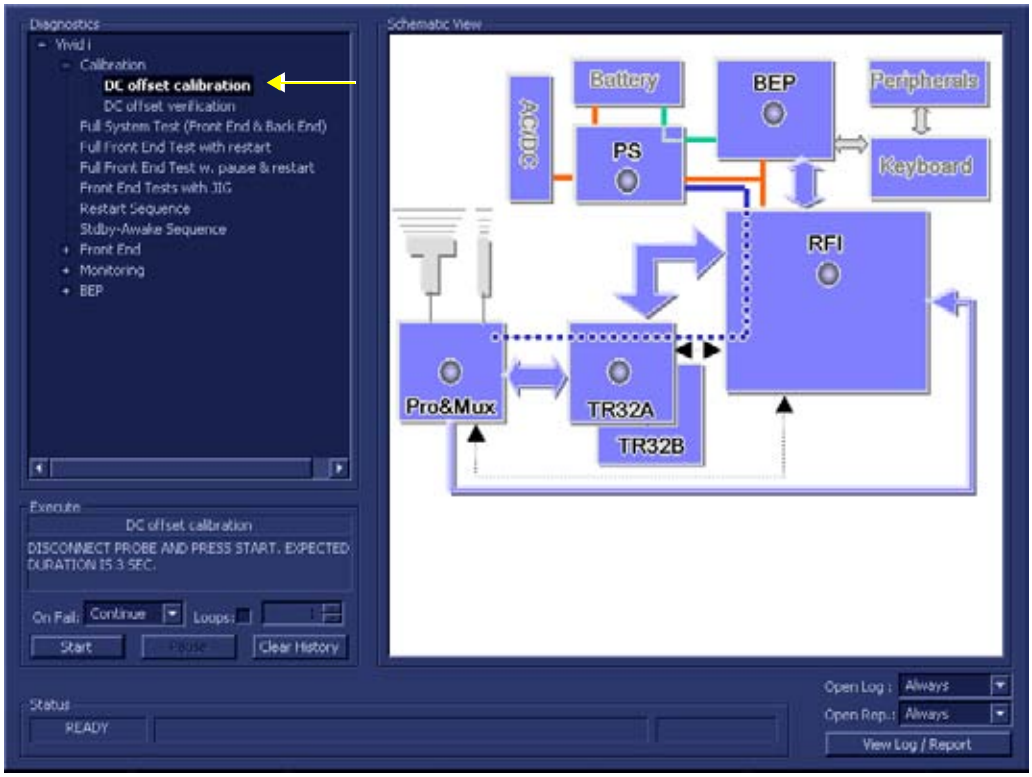


Figure 7-7 DC Offset Calibration Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The DC Offset Calibration Test commences. While the test proceeds, the name of the test currently in progress (DC Offset Calibration) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the DC Offset Calibration Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed, as shown in the example in Figure 7-8.

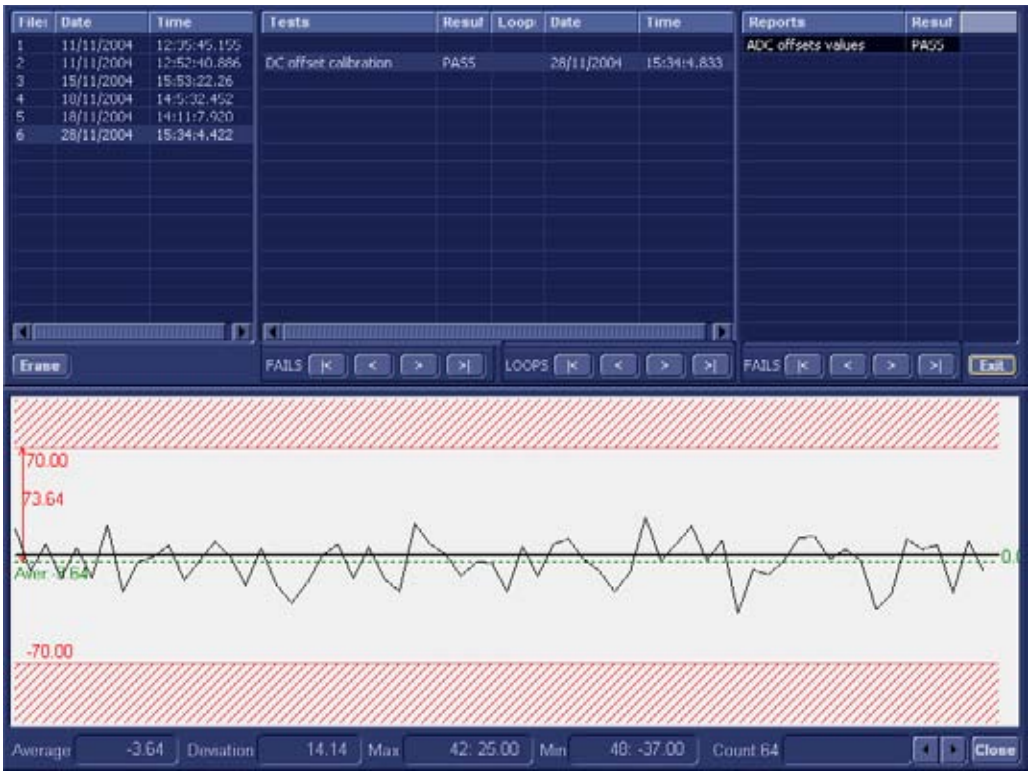


Figure 7-8 View Test Log - DC Offset Calibration

Note: There is one test report (ADC Offset values) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

8.) Use the scroll arrows at the bottom of the Reports window (see Figure 7-8) to scroll through the channels and view the corresponding results.

9) When done, trackball to the **Close** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, repeat the DC Offset Calibration test again and review the newly-acquired results.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE Medical Systems On-Line Center for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-2-2 DC Offset Verification

NOTE: For a description of this test, refer to the information provided in DC Offset Verification on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **DC Offset Verification** in the list of tests available for selection from the Diagnostic Test Tree (see Figure 7-9 below) and press **Set**. The DC Offset Verification name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PM, TR32 and RFI boards), as shown below:

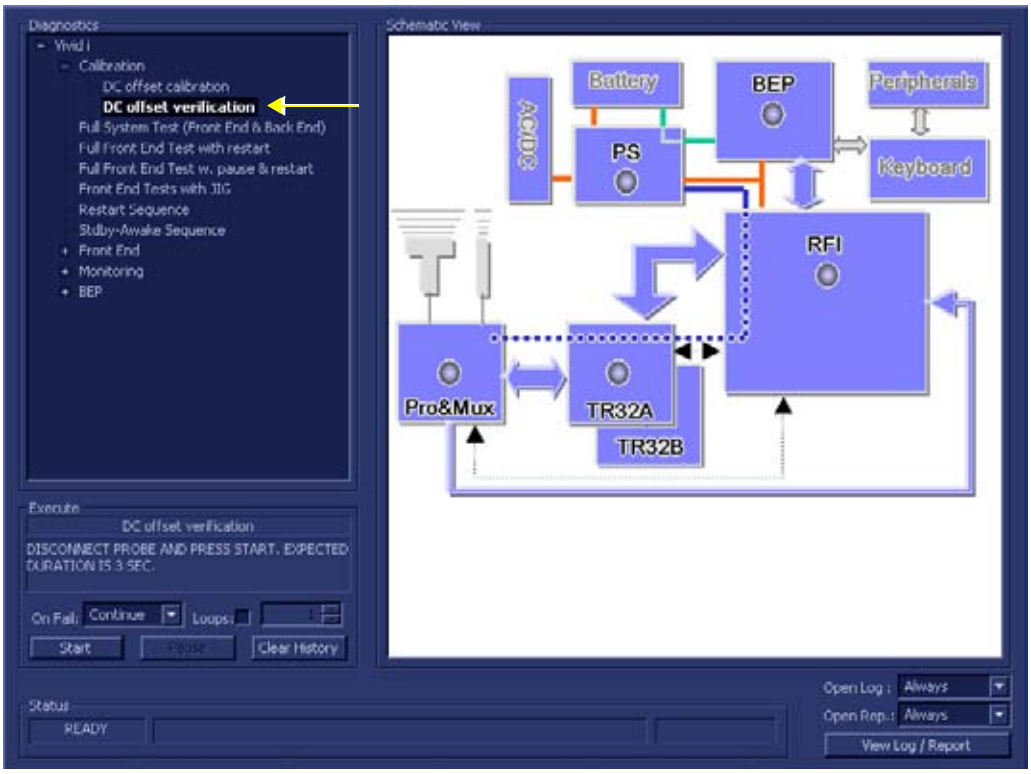


Figure 7-9 DC Offset Verification Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The DC Offset Verification Test commences. While the test proceeds, the name of the test currently in progress (DC Offset Verification) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the DC Offset Verification Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-10.

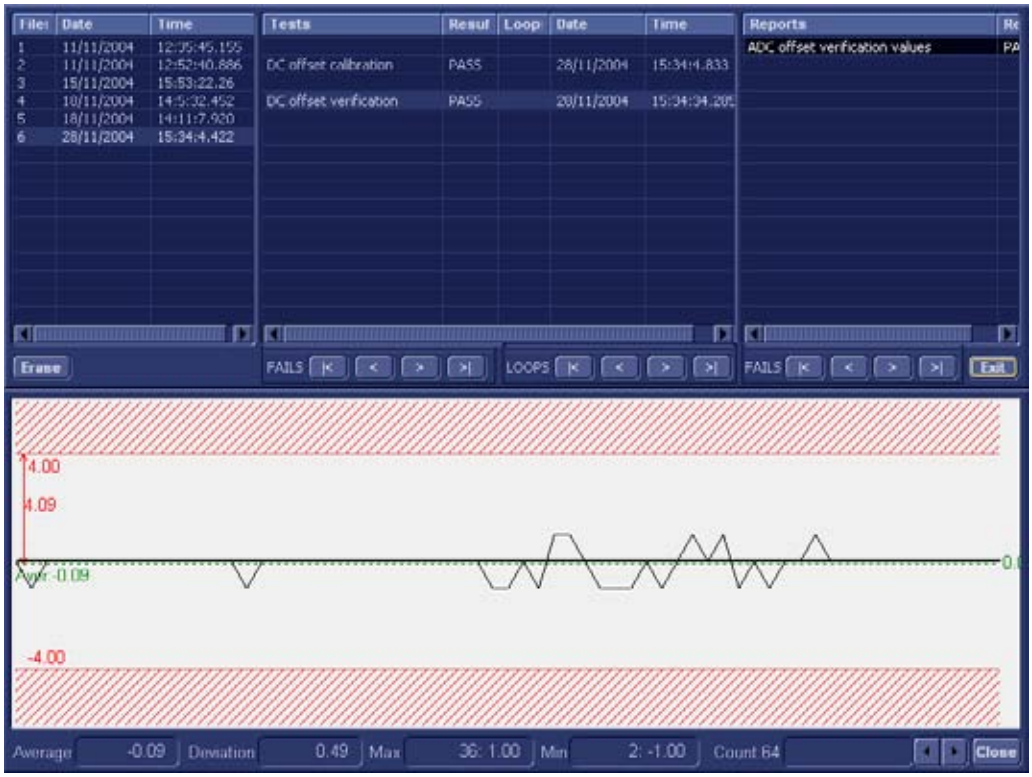


Figure 7-10 View Test Log - DC Offset Verification Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of Test results.

Note: For this test, there is one report (ADC Offset verification values) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

9.) Use the scroll arrows at the bottom of the Reports window (see Figure 7-10) to scroll through the channels and view the corresponding results.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

Note: In the event that the surrounding temperature is above 38°C, the DC Offset Verification Test may fail. Upper/lower test limits of ±10 (instead of ±5) are acceptable.

12.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3 Radio Frequency Interface (RFI) Diagnostic Tests

7-4-3-1 Accessing the RFI Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the *Accessing the Front End Diagnostic Options* section, on page 7-25.

7-4-3-2 Full RFI Test

NOTE: For a description of this test, refer to the information provided in Full RFI Test on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **Full RFI Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-11 below) and press **Set**. The Full RFI Test name is displayed under *Execute;* the relevant system component to be tested is highlighted light blue in the Schematic View (RFI), as shown below:

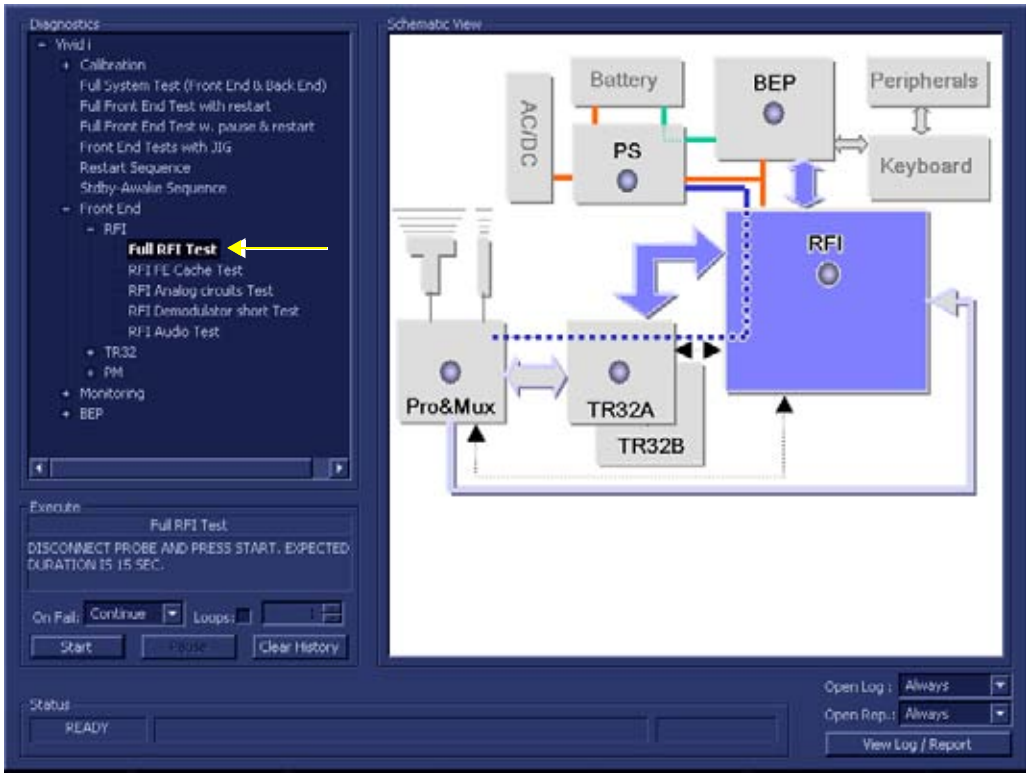


Figure 7-11 Full RFI Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Full RFI Test commences. While the test proceeds, the name of the test currently in progress (Full RFI Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full RFI Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in the example in Figure 7-12.

Figure 7-12 View Test Log - Full RFI Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

Note: For the Full RFI test, four tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-12. For each currently-selected test (for example, *RFI FE Cache Test*) the corresponding report is listed in *Reports* on the right.
For details of each report, refer to the following explanations:

- View Test Log - RFI Cache Test on page 7 - 35
- View Test Log - RFI Demodulator Short Test on page 7 - 41
- View Test Log - RFI Analog Circuits Test on page 7 - 38
- View Test Log - RFI Audio Test on page 7 - 44

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-3 RFI FE Cache Test

NOTE: For a description of this test, refer to the information provided in RFI FE Cache Test on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI FE Cache Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-9 below) and press **Set**. The RFI FE Cache Test name is displayed under *Execute;* the relevant system component to be tested remain highlighted light blue in the Schematic View (RFI), as shown below:

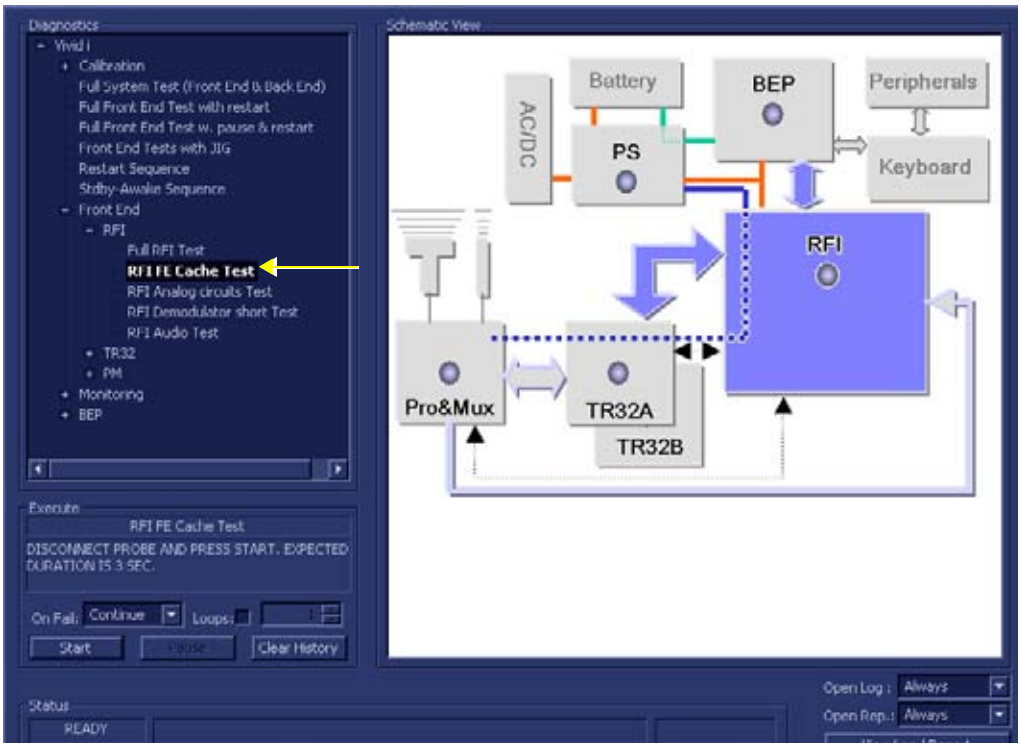


Figure 7-13 RFI FE Cache Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI FE Cache Test commences. While the test proceeds, the name of the test currently in progress (RFI FE Cache Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI FE Cache Test sequence is complete

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-14.

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of Test results.

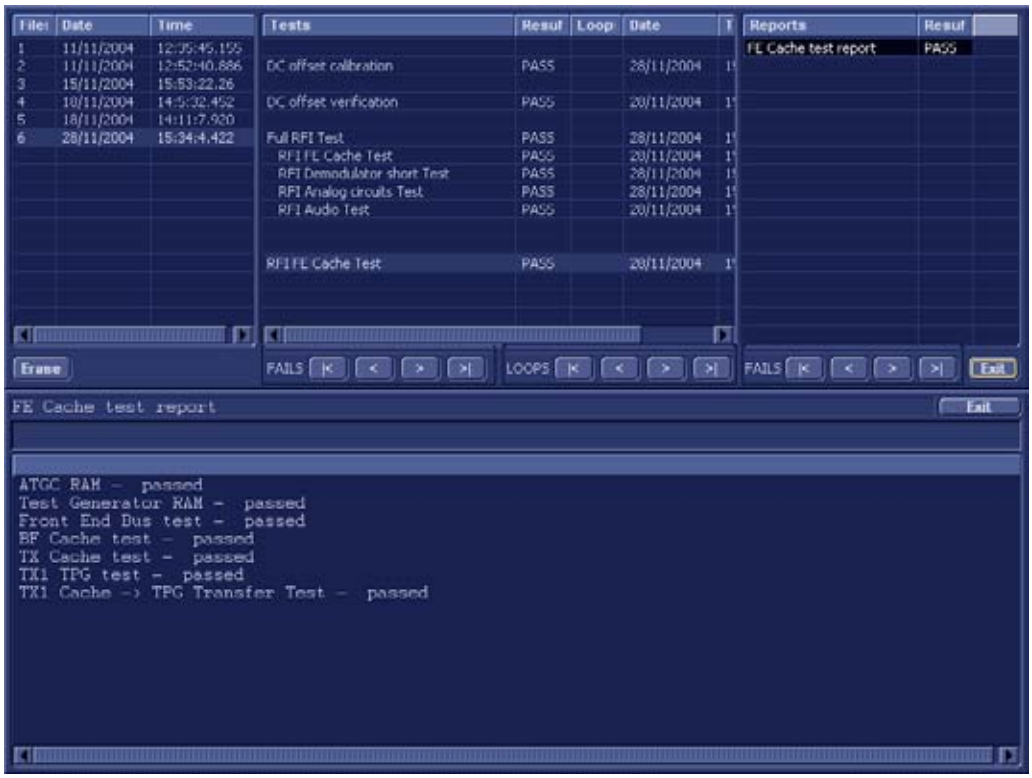


Figure 7-14 View Test Log - RFI Cache Test

Note: For this test, there is one report (FE Cache Test report) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-4 RFI Analog Circuits Test

NOTE: For a description of this test, refer to the information provided in RFI Analog Circuits Test on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI Analog Circuits Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-15 below) and press **Set**. The RFI Analog Circuits Test name is displayed under *Execute;* the relevant system component to be tested are highlighted light blue in the Schematic View (RFI), as shown below:

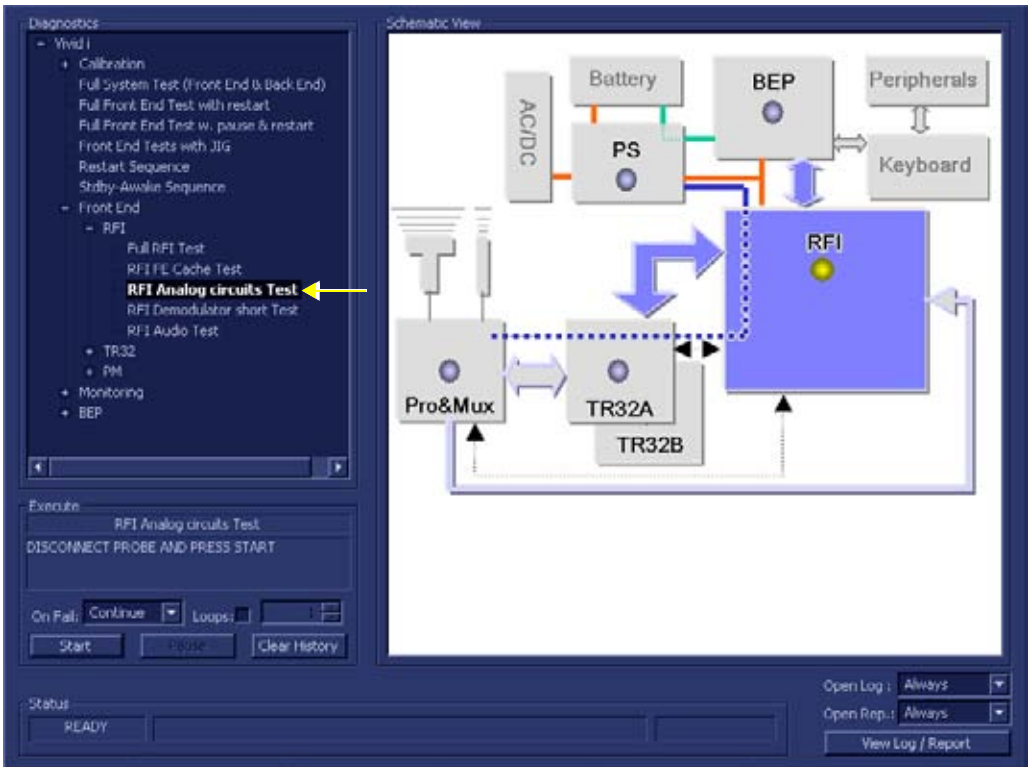


Figure 7-15 RFI Analog Circuits Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI Analog Circuits Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI Analog Circuits Test sequence is complete,

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-16.

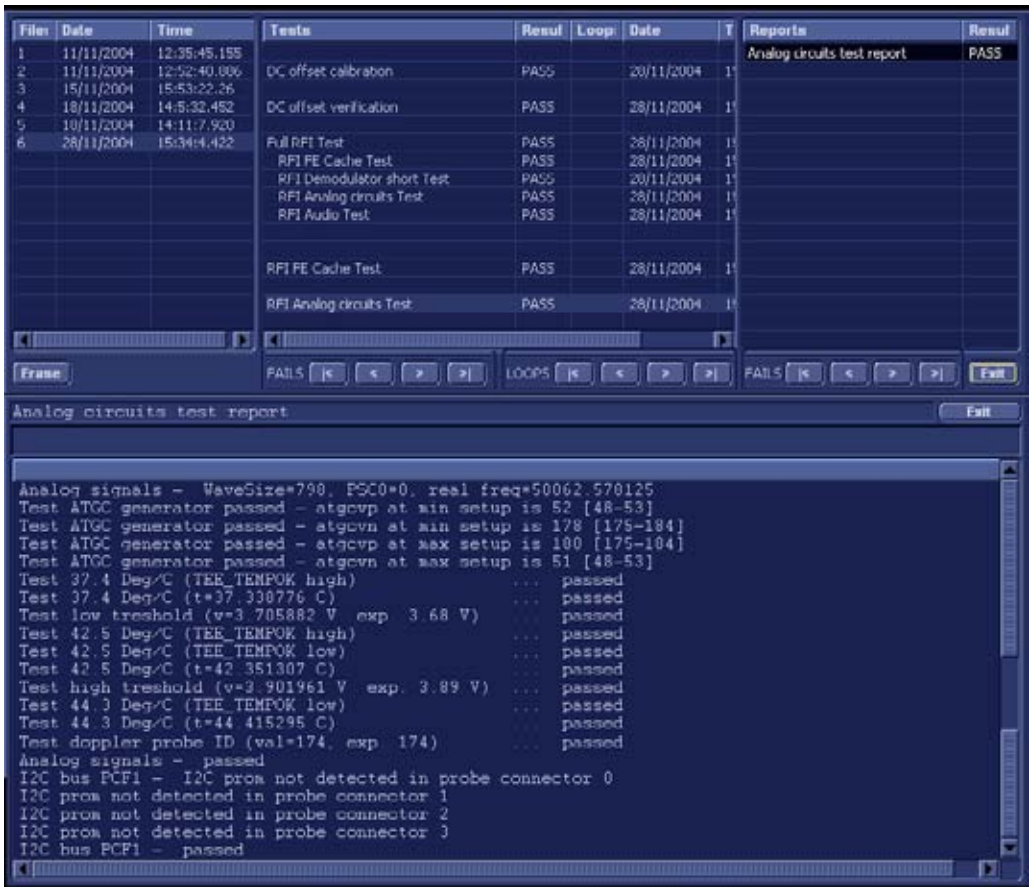

Analog circuits test report
Exit
Analog signals - WaveSize=790, PSC0=0, real freq=50062.570125
Test ATGC generator passed - atgcvp at min setup is 52 [48-53]
Test ATGC generator passed - atgcvn at min setup is 178 [175-184]
Test ATGC generator passed - atgcvp at max setup is 100 [175-184]
Test ATGC generator passed - atgcvn at max setup is 51 [48-53]
Test 37.4 Deg/C (TEE_TEMPOK high) ... passed
Test 37.4 Deg/C (t=37.330776 C) ... passed
Test low treshold (v=3.705882 V exp 3.68 V) ... passed
Test 42.5 Deg/C (TEE_TEMPOK high) ... passed
Test 42.5 Deg/C (TEE_TEMPOK low) ... passed
Test 42.5 Deg/C (t=42.351307 C) ... passed
Test high treshold (v=3.901961 V exp 3.89 V) ... passed
Test 44.3 Deg/C (TEE_TEMPOK low) ... passed
Test 44.3 Deg/C (t=44.415295 C) ... passed
Test doppler probe ID (val=174, exp 174) ... passed
Analog signals - passed
I2C bus PCF1 - I2C prom not detected in probe connector 0
I2C prom not detected in probe connector 1
I2C prom not detected in probe connector 2
I2C prom not detected in probe connector 3
I2C bus PCF1 - passed

Figure 7-16 View Test Log - RFI Analog Circuits Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

Note: For this test, there is one report (Analog Circuits Test report) which is listed in *Reports* on the right. By default, this report is displayed in the Reports window below (Figure 7-16). Use the Report window scroll bars and/or arrows to scroll through complete report if necessary.

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-5 RFI Demodulator Short Test

NOTE: For a description of this test, refer to the information in RFI Demodulator Short Test on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI Demodulator Short Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-17 below) and press **Set**. The RFI Demodulator Short Test name is displayed under *Execute;* the relevant system component to be tested are highlighted light blue in the Schematic View (RFI), as shown below:

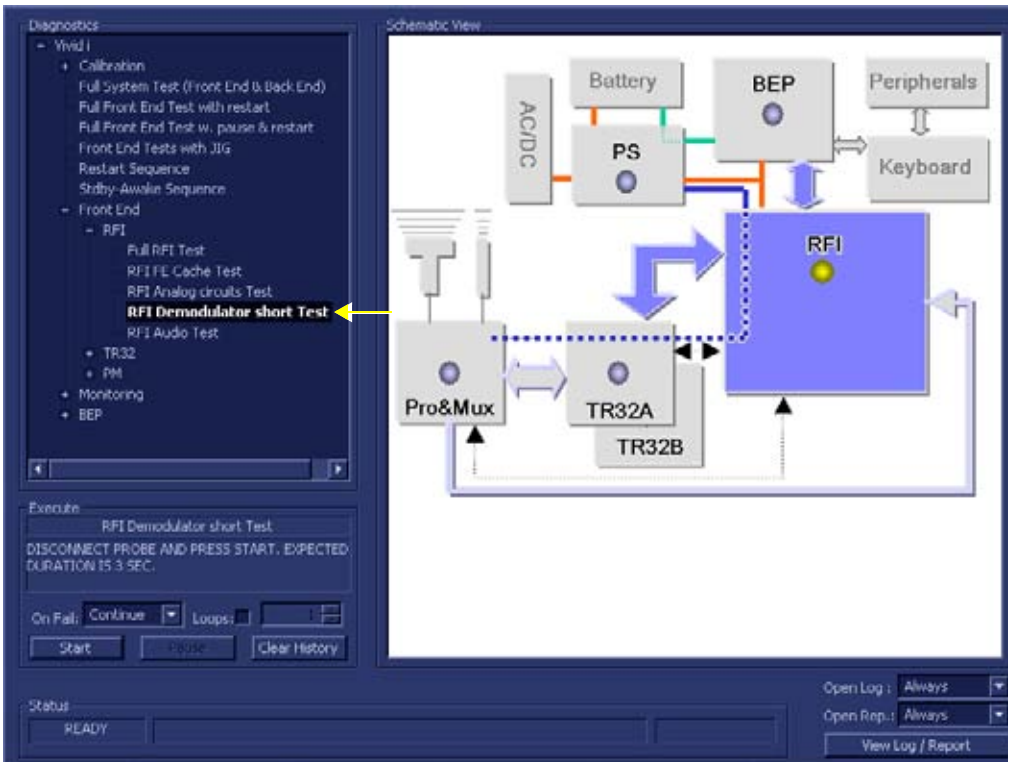


Figure 7-17 RFI Demodulator Short Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI Demodulator Short Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI Demodulator Short Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-18.

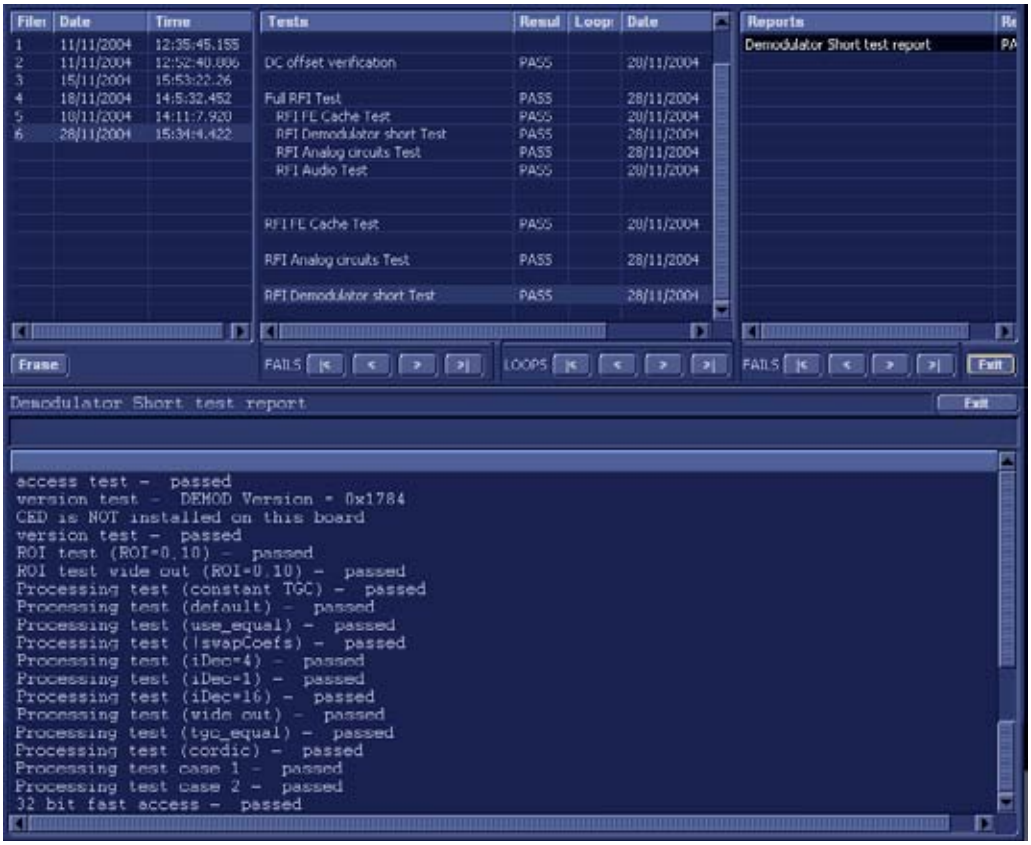


Figure 7-18 View Test Log - RFI Demodulator Short Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

Note: For this test, there is one report (Demodulator Short Test report) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below (Figure 7-18). Use the Report window scroll bars and/or arrows to scroll through complete report if necessary.

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-6 RFI Audio Test

NOTE: For a description of this test, refer to the information provided in RFI Audio Test on page 7 - 11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI Audio Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-9 below) and press **Set**. The RFI Audio Test name is displayed under *Execute;* the relevant system component to be tested is highlighted light blue in the Schematic View (RFI), as shown below:

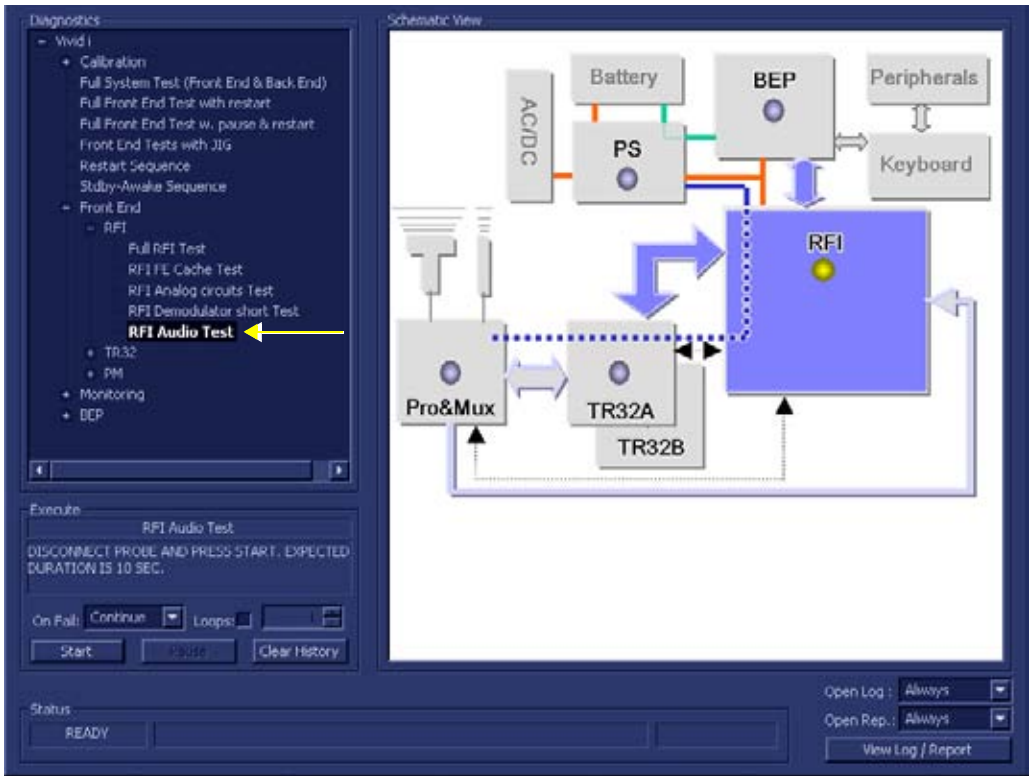


Figure 7-19 RFI Audio Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI Audio Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

When the *upper* progress bar reaches approximately midway in the *Status* area, a loud, high-pitched sound will be heard coming from the speakers.

Note: If no sound is heard, it is necessary to perform the BEP Audio Test as described in Audio Test on page 7 - 133**.** In the event this test also fails, the problem is probably in the BEP - refer to Performing Back End Diagnostics on the System on page 7 - 109.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI Audio Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-20.

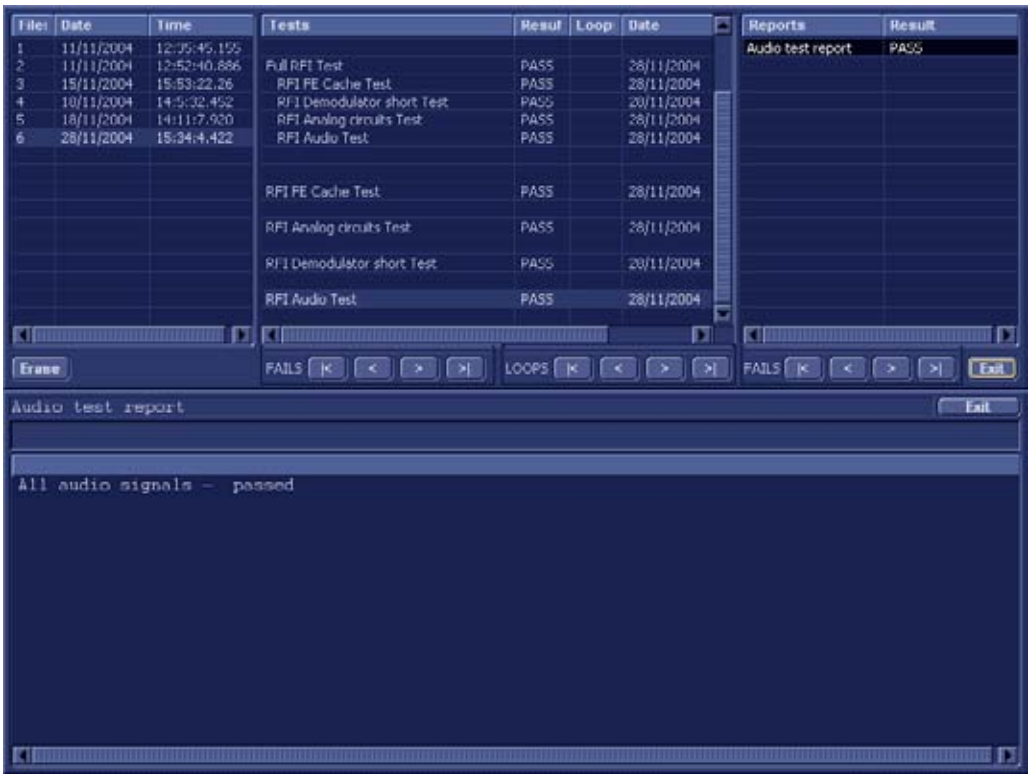


Figure 7-20 View Test Log - RFI Audio Test

Note: For this test, this one report (Demodulator Short Test report) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below, as shown in the example in Figure 7-20.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

7-4-4 TR 32 Diagnostic Tests

NOTE: The TR32 Diagnostic Tests are used to perform functional testing of both the TR32A and TR32 boards.

7-4-4-1 Accessing the TR32 Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the *Accessing the Front End Diagnostic Options* section, on page 7-25.

7-4-4-2 Beamformer Tests

7-4-4-2-1 TR32 BF Digital Test

NOTE: For a description of this test, refer to the information in TR32 BF Digital Test on page 7 - 12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **TR32 BF Digital Test** in the list of *TR32, BF* tests available for selection from the Diagnostic Test Tree (see Figure 7-21 below) and press **Set**. The TR32 BF Digital Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A and TR32B), as shown below:

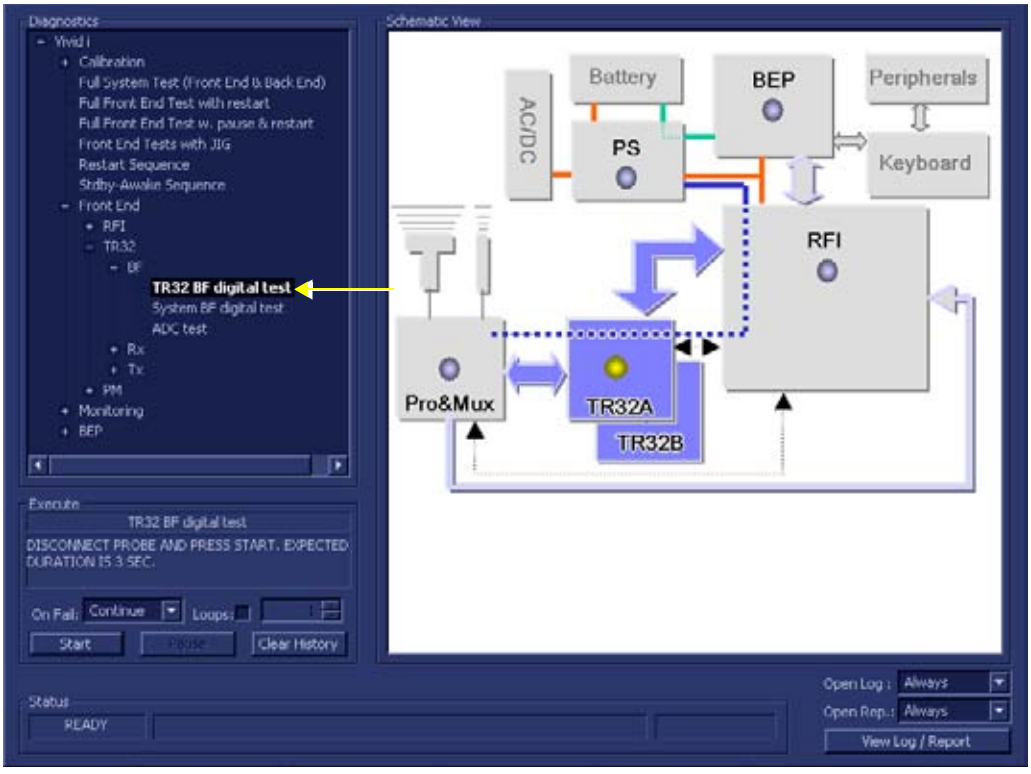


Figure 7-21 TR32 BF Digital Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The TR32 BF Digital Test **c**ommences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the TR32 BF Digital Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-22.

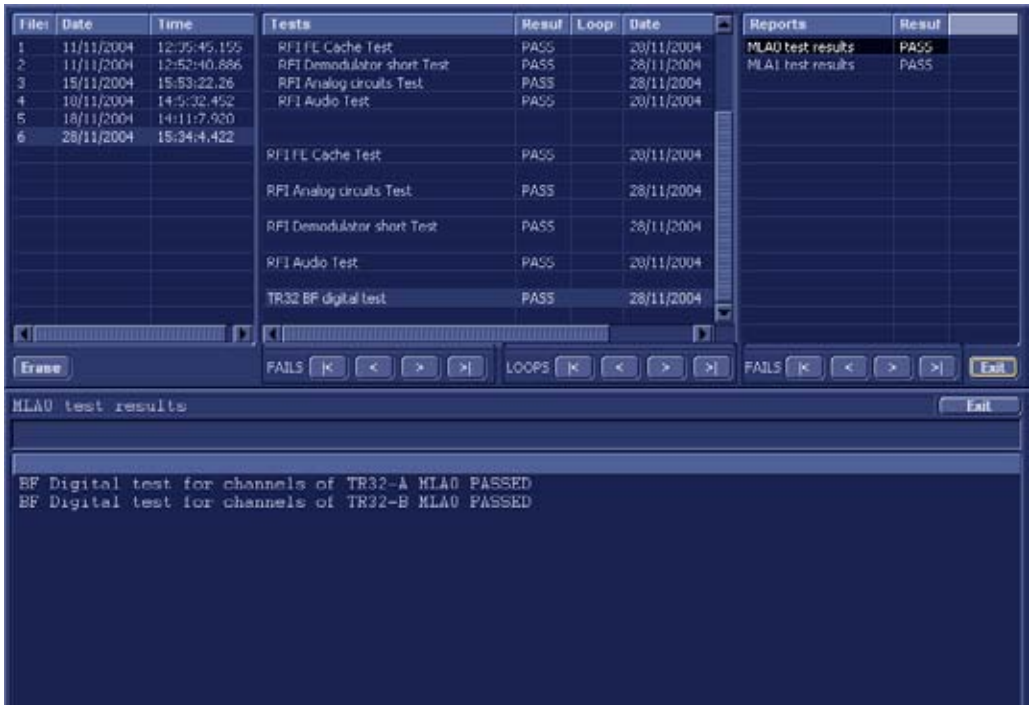


Figure 7-22 View Test Log - TR32 BF Digital Test (MLA0)

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

Note: For this test, there are two reports (MLA0 and MLA1) which is listed in *Reports* on the right. By default, the MLA0 report is displayed in the Reports window below, showing the results for both the TR32A and TR32B boards (Figure 7-22).

9.) To view the MLA1 test results in the Report window, select MLA1 test results under *Reports*.

The MLA1 report is displayed in the Reports window below:

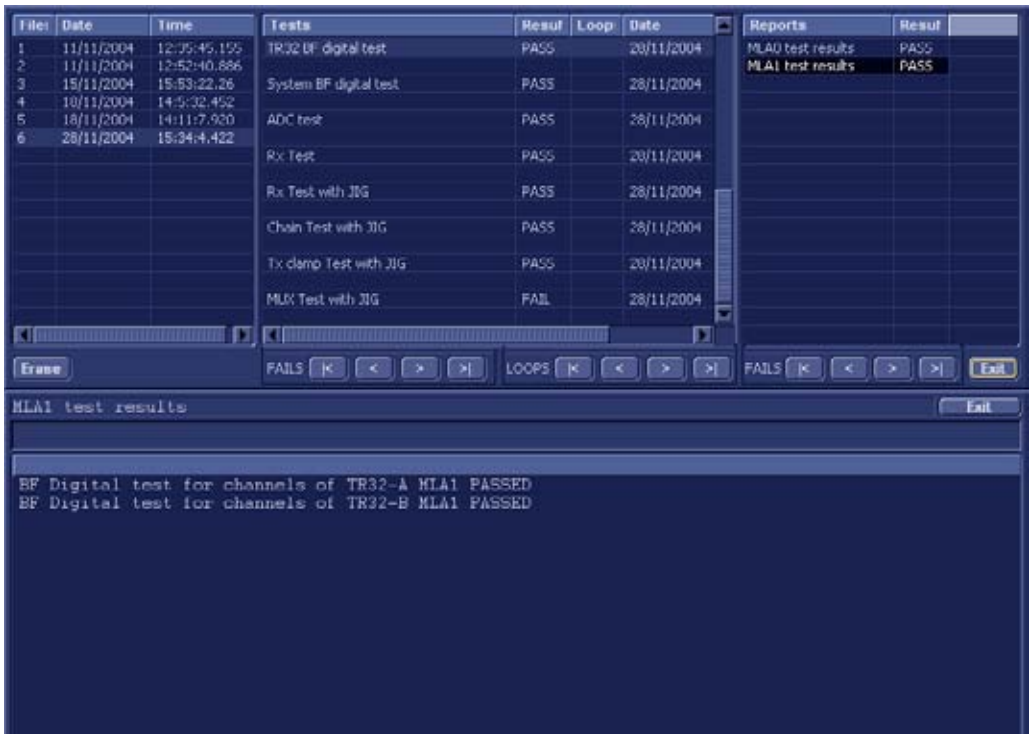


Figure 7-23 View Test Log - TR32 BF Digital Test (MLA1)

10) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

11) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

12.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-4-2-2 System BF Digital Test

NOTE: For a description of this test, refer to the information in System BF Digital Test on page 7 - 12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **System BF Digital Test** in the list of *TR32, BF* tests available for selection from the Diagnostic Test Tree (see Figure 7-9 below) and press **Set**. The System BF Digital Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A. TR32B), as shown below:

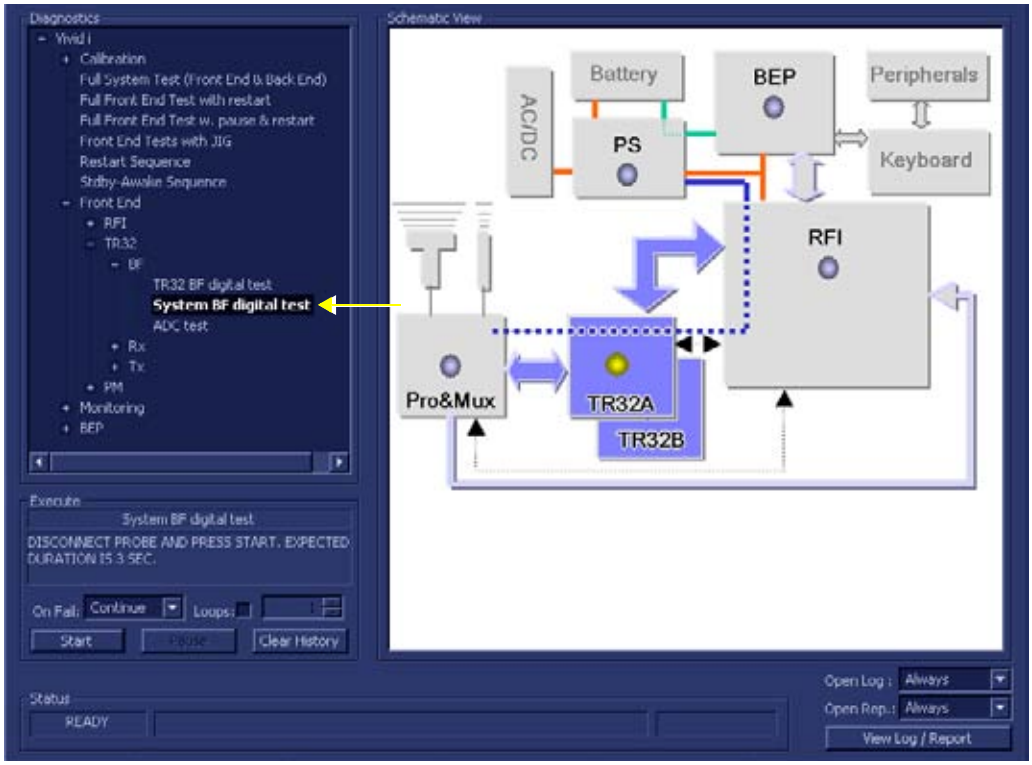


Figure 7-24 System BF Digital Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The System BF Digital Test commences. While the test proceeds, the name of the test currently in progress (System BF Digital Test) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the System BF Digital Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-25.

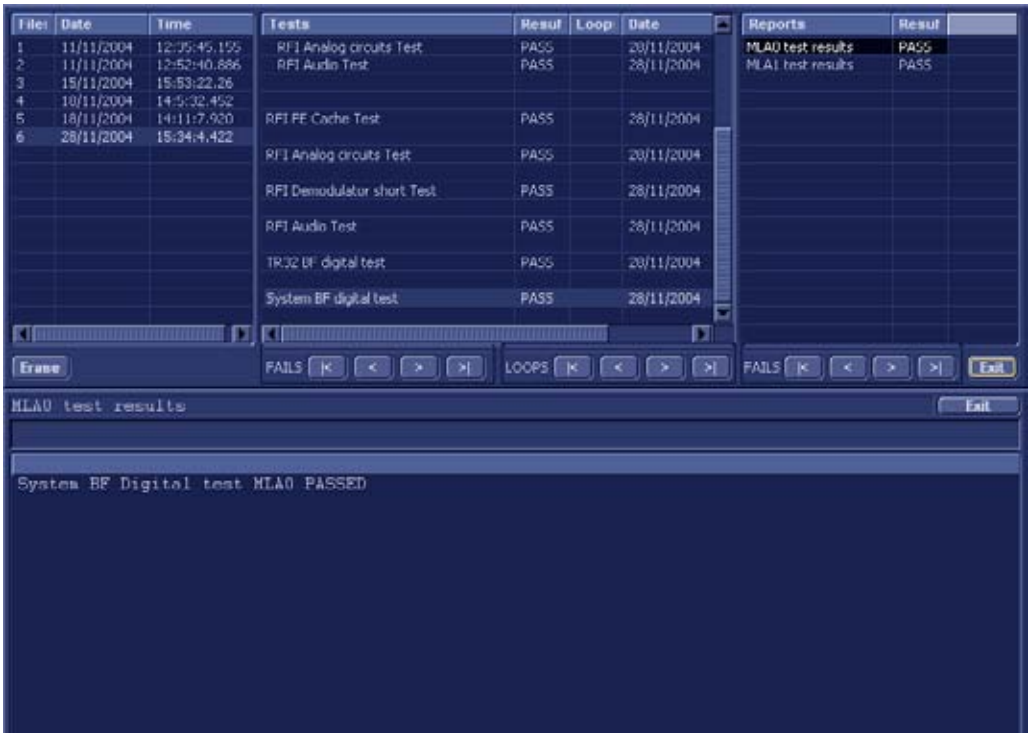


Figure 7-25 View Test Log - System BF Digital Test (MLA0)

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

Note: For this test, there are two reports (MLA0 and MLA1) which is listed in *Reports* on the right. By default, the MLA0 report is displayed in the Reports window below (Figure 7-25).

9.) To view the MLA1 test results, select MLA1 test results under *Reports*.

The MLA1 test results are displayed in the Report Window, as shown below.

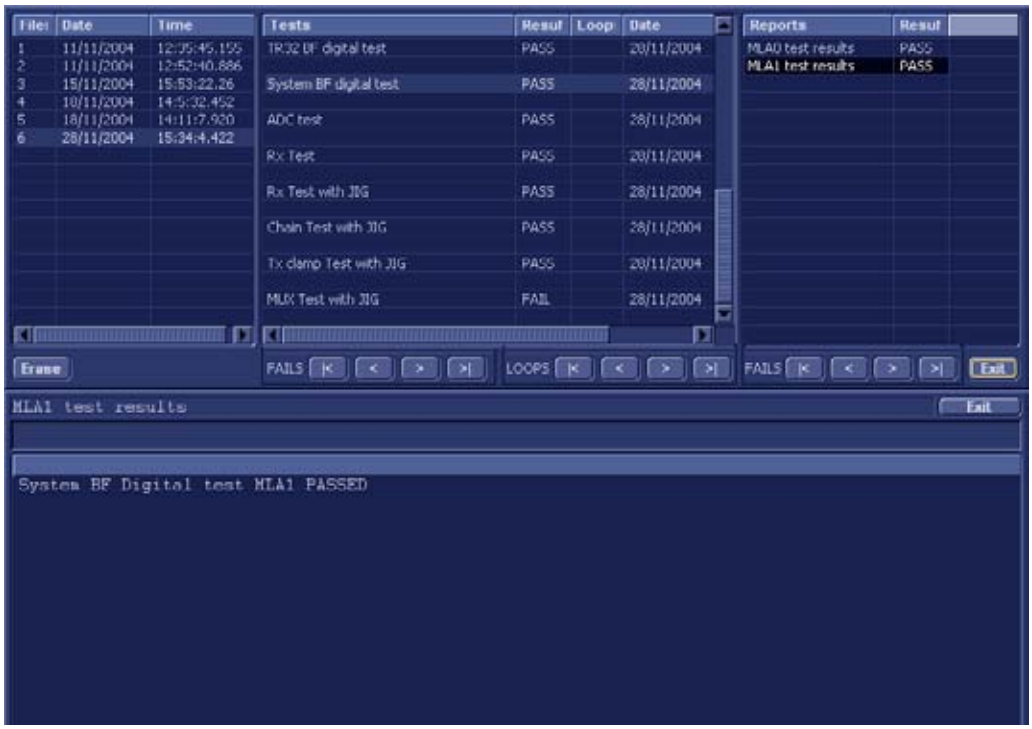


Figure 7-26 View Test Log - System BF Digital Test (MLA1)

10) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

11) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

12.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-4-2-3 ADC Test

NOTE: For a description of this test, refer to the information in ADC Test on page 7 - 12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **ADC Test** in the list of *TR32, BF* tests available for selection from the Diagnostic Test Tree (see Figure 7-9 below) and press **Set**. The ADC Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A. TR32B), as shown below:

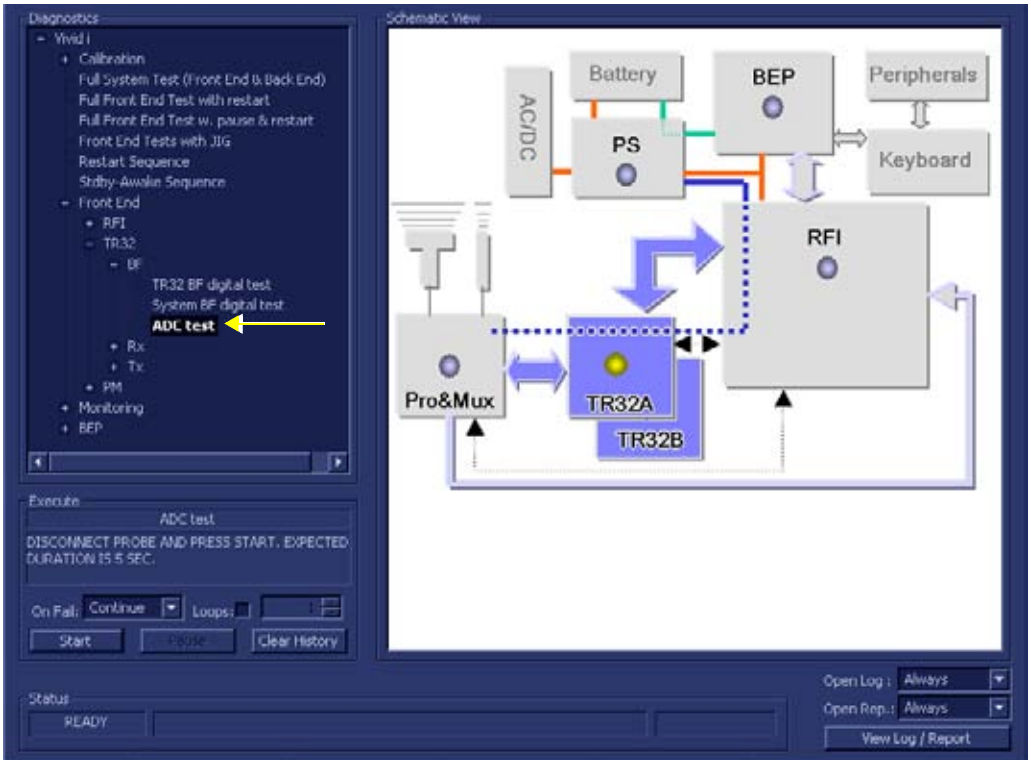


Figure 7-27 ADC Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The ADC Test commences. While the test proceeds, the name of the test currently in progress (ADC Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ADC Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-28.

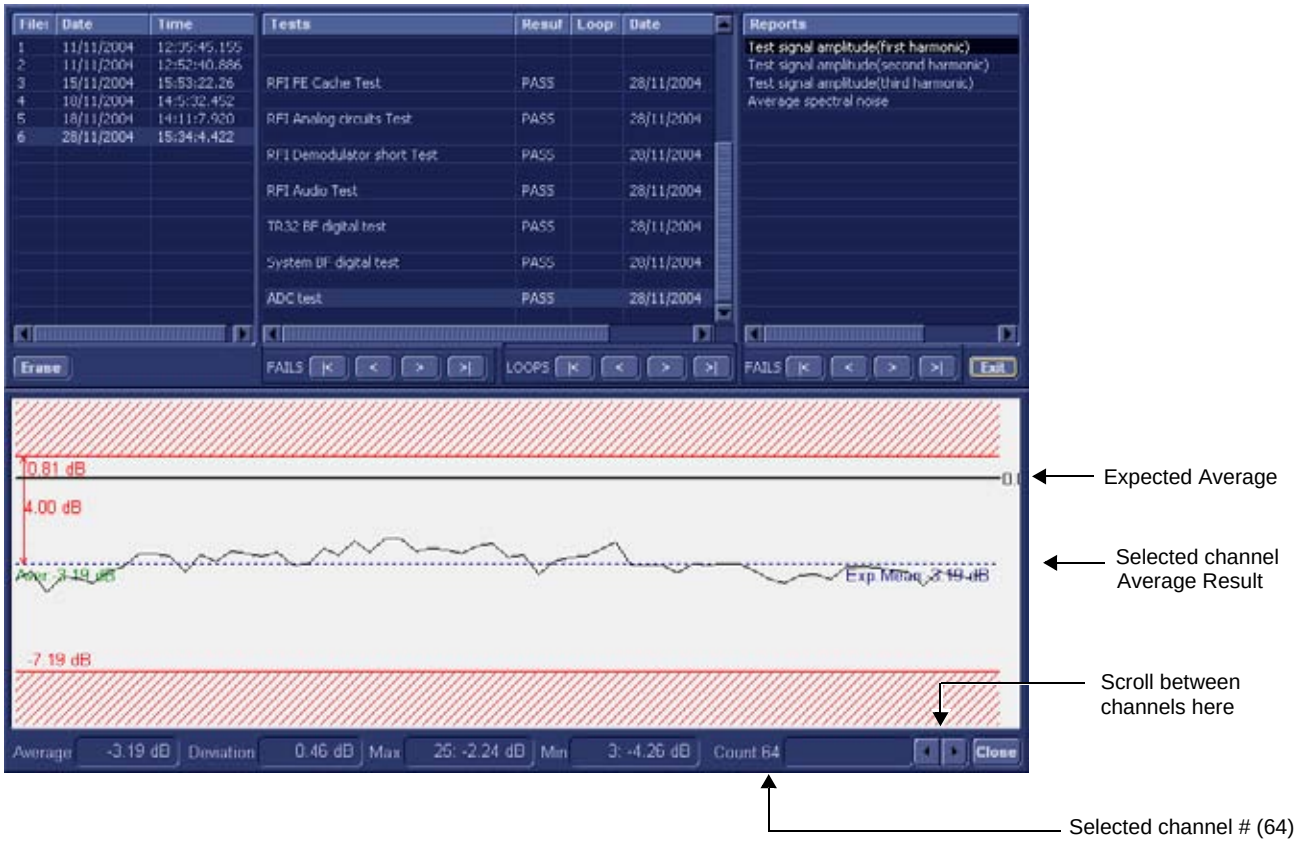


Figure 7-28 View Test Log - First Harmonic Report

Note: The ADC test has four test reports which are listed in *Reports* on the right. By default, the *First Harmonic* report is displayed in the Reports window below (Figure 7-28).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels. Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-28.

8) When done, trackball to the **Close** button and press **Set** to close the View Report window.

9.) Select the second report (the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-29).

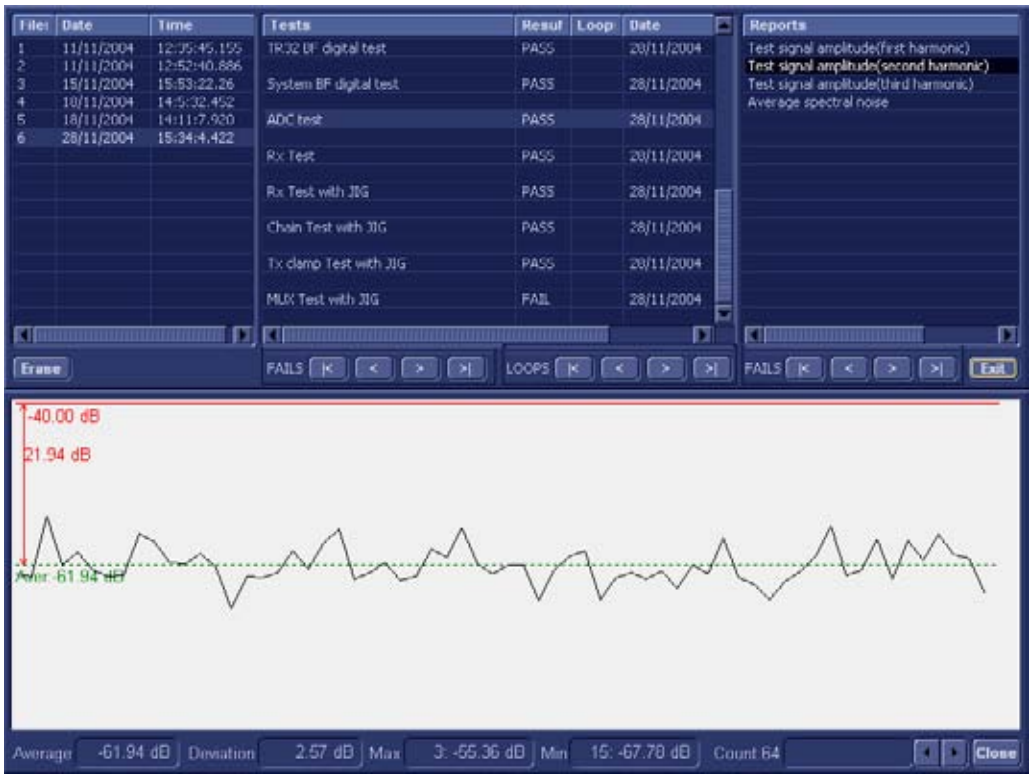


Figure 7-29 View Test Log - Second Harmonic

10.) Use the tools provided to scroll through the channels and view the results, as previously described.

11) When done, trackball to the **Close** button and press **Set** to close the View Report window.

12.) Select the third report (the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-30).

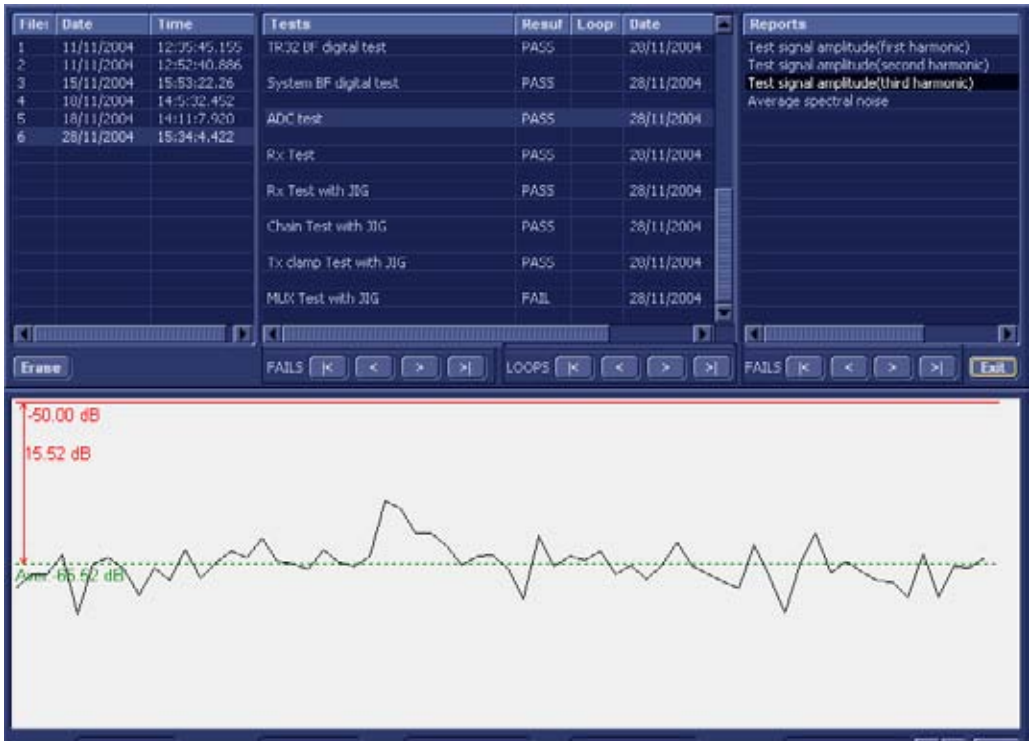


Figure 7-30 View Test Log - Third Harmonic

13.) Use the tools provided to scroll through the channels and view the results, as previously described.

14) When done, trackball to the **Close** button and press **Set** to close the View Report window.

15.) Select the fourth report (the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-31).

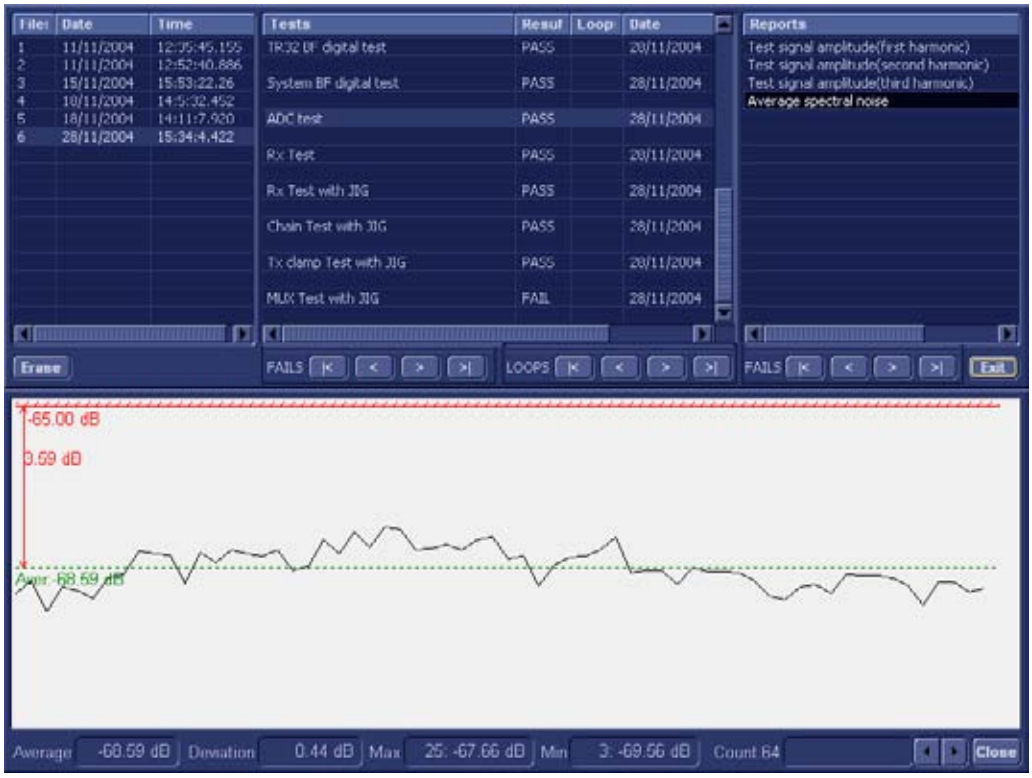


Figure 7-31 View Test Log - Average

16.) Use the tools provided to scroll through the channels and view the results, as previously described.

17) When done, trackball to the **Close** button and press **Set** to close the View Report window.

18) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

19.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

20.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-4-3 Receive (RX) Tests

7-4-4-3-1 RX Test

NOTE: For a description of this test, refer to the information in RX Test on page 7 - 12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **Rx Test** in the list of *RX* tests available for selection from the Diagnostic Test Tree (see Figure 7-32 below) and press **Set**. The RX Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A. TR32B), as shown below:

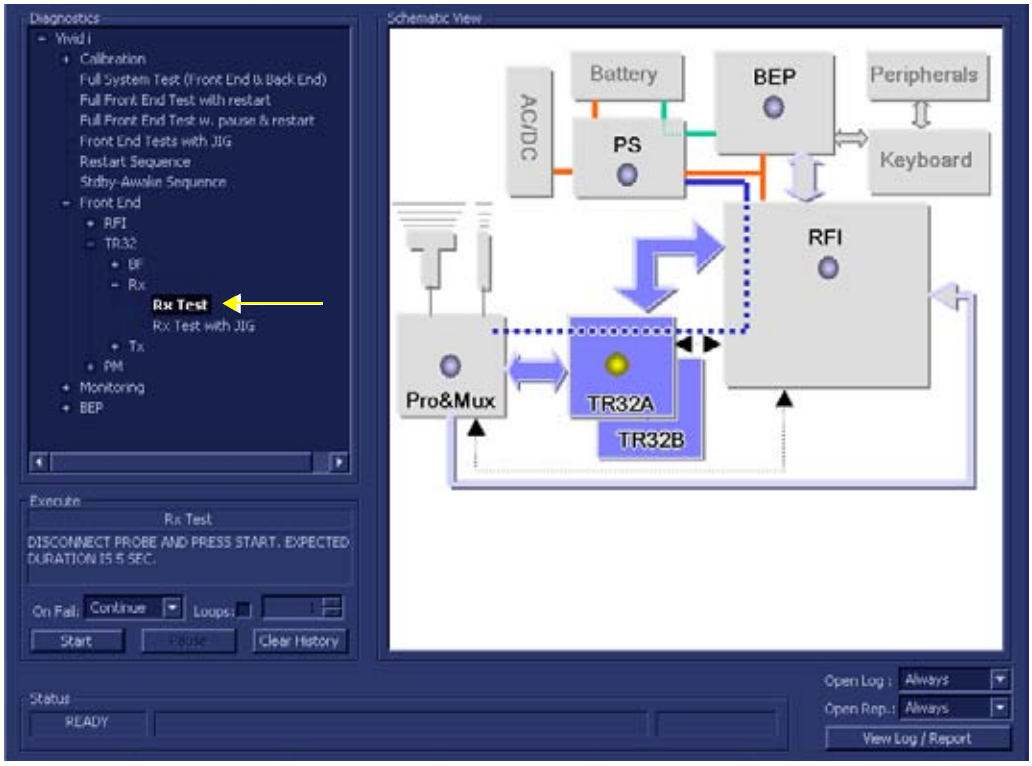


Figure 7-32 Rx Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Rx Test commences. While the test proceeds, the name of the test currently in progress (Rx Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Rx Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-33.

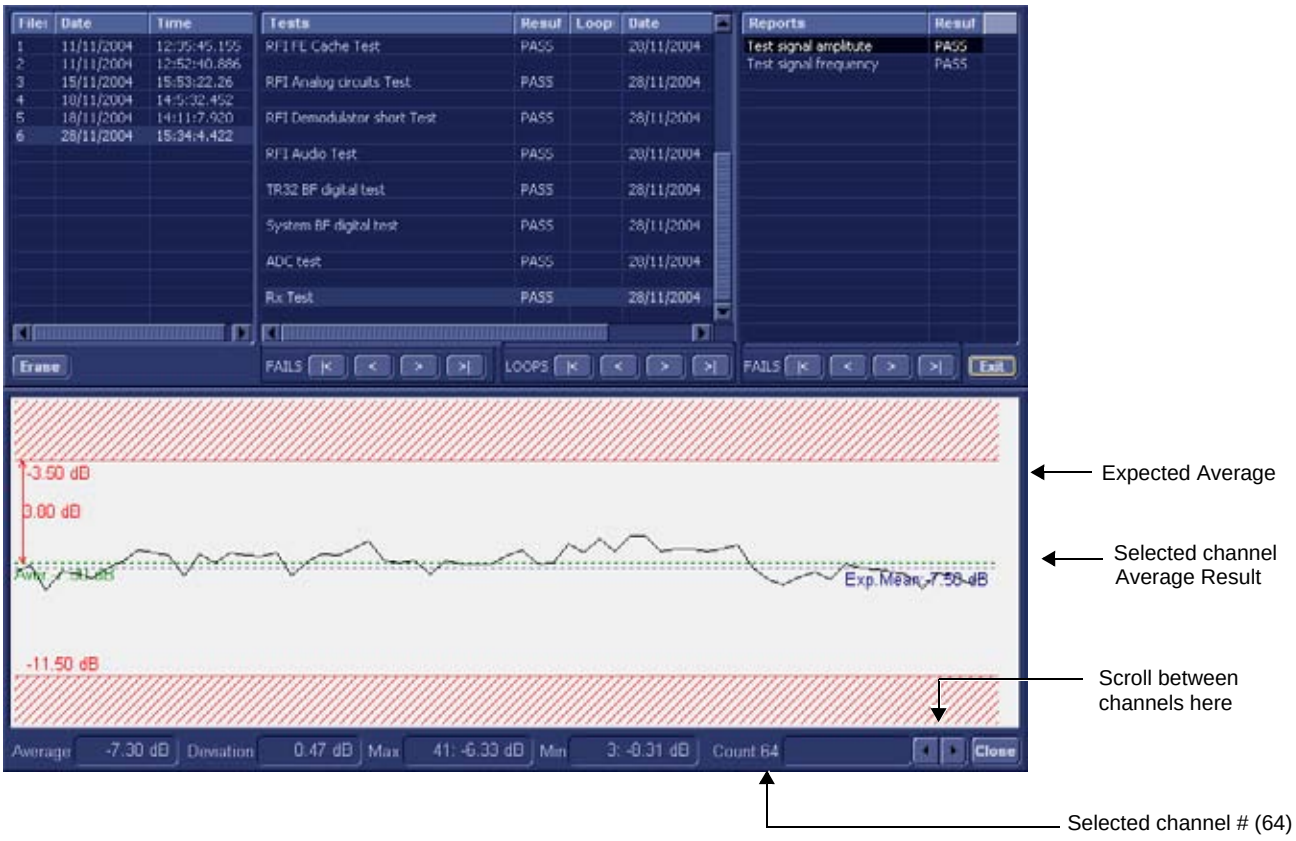


Figure 7-33 View Test Log - Rx Test Signal Amplitude

Note: The Rx test has two test reports (*Test Signal Amplitude* and *Frequency*) which are listed in the *Reports* window on the right. By default, the *Test Signal Amplitude* report is displayed in the Reports window below (Figure 7-33).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-33.

8) When done, trackball to the **Close** button and press **Set** to close the View Report window.

9) Select the second report (*Frequency*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-29.

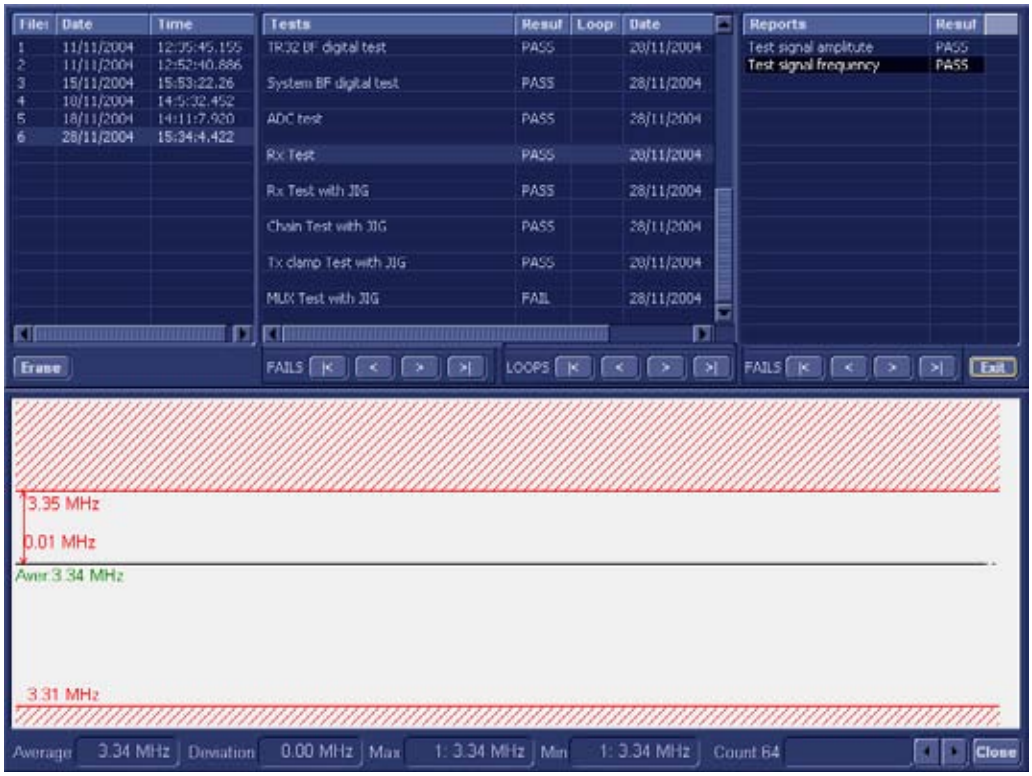


Figure 7-34 View Test Log - Rx Test Signal Frequency

10.) Use the tools provided to scroll through the channels and view the results, as previously described.

11) When done, trackball to the **Close** button and press **Set** to close the View Report window.

12) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

13.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

14.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5 Probe and MUX Diagnostic Tests

7-4-5-1 Accessing the Probe and MUX Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the *Accessing the Front End Diagnostic Options* section, on page 7-25.

7-4-5-2 ACW Test

7-4-5-2-1 ACW IQ Symmetry Test

NOTE: For a description of this test, refer to the information in ACW IQ Symmetry Test on page 7 - 12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

IMPORTANT It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in DC Offset Calibration on page 7 - 25.

1.) In the *Diagnostic Test* window, trackball to **ACW IQ Symmetry Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-32 below) and press **Set**. The ACW IQ Symmetry Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

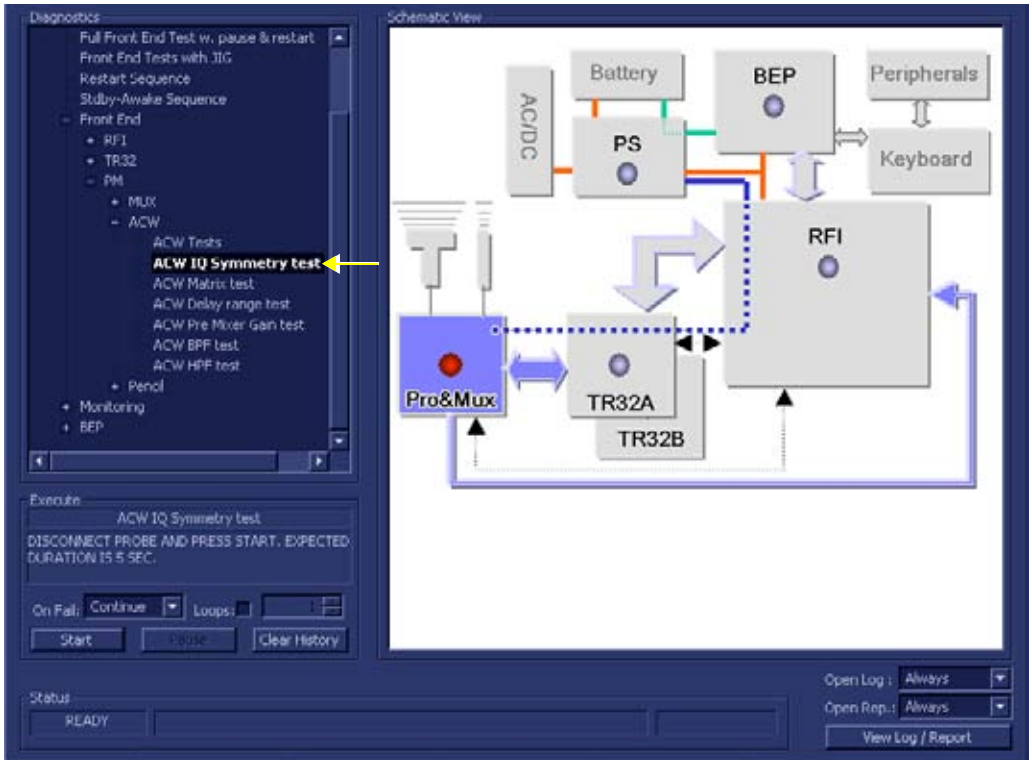


Figure 7-35 ACW IQ Symmetry Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW IQ Symmetry Test commences. While the test proceeds, the name of the test currently in progress (ACW IQ Symmetry Test) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW IQ Symmetry Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-36.

Figure 7-36 View Test Log - ACW IQ Symmetry Test

Note: The ACW IQ Symmetry Test test has one test report. By default, this is displayed in the Reports window below (Figure 7-36).

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in DC Offset Calibration on page 7 - 25.
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5-2-2 ACW Matrix Test

NOTE: *For a description of this test, refer to the information in ACW Matrix Test on page 7 - 13.*

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: *When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!*

IMPORTANT It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in DC Offset Calibration on page 7 - 25.

1.) In the *Diagnostic Test* window, trackball to **ACW Matrix Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-37 below) and press **Set**. The ACW Matrix Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

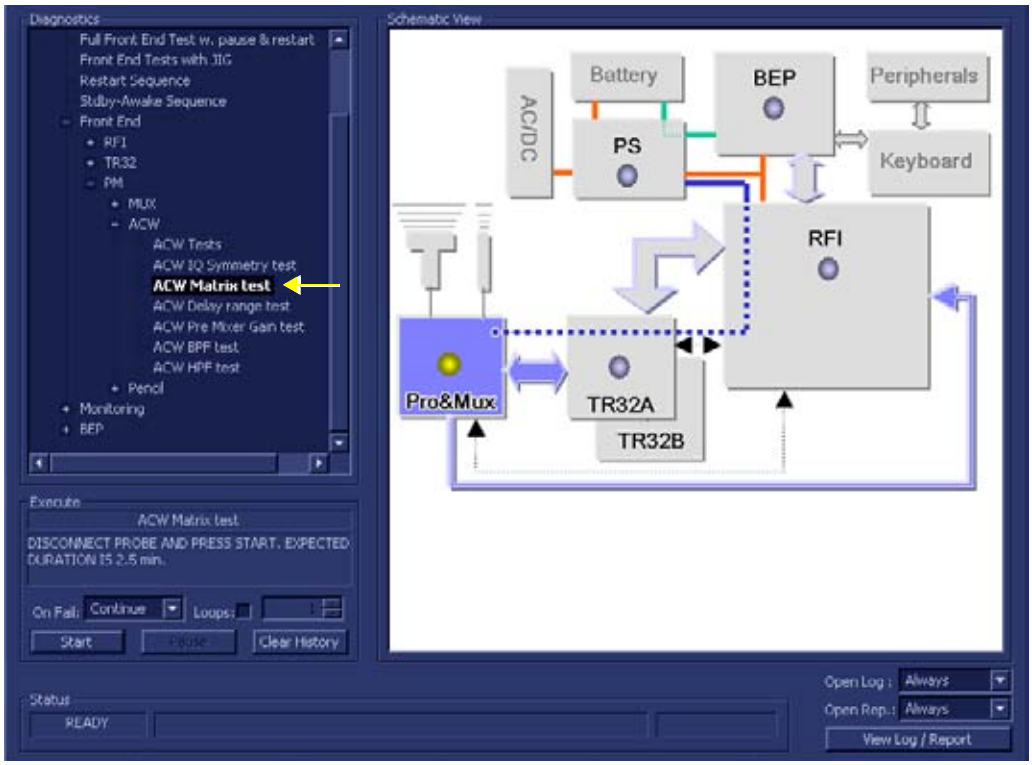


Figure 7-37 ACW Matrix Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW Matrix Test commences. While the test proceeds, the name of the test currently in progress (ACW IQ Symmetry Test) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW Matrix Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-38.

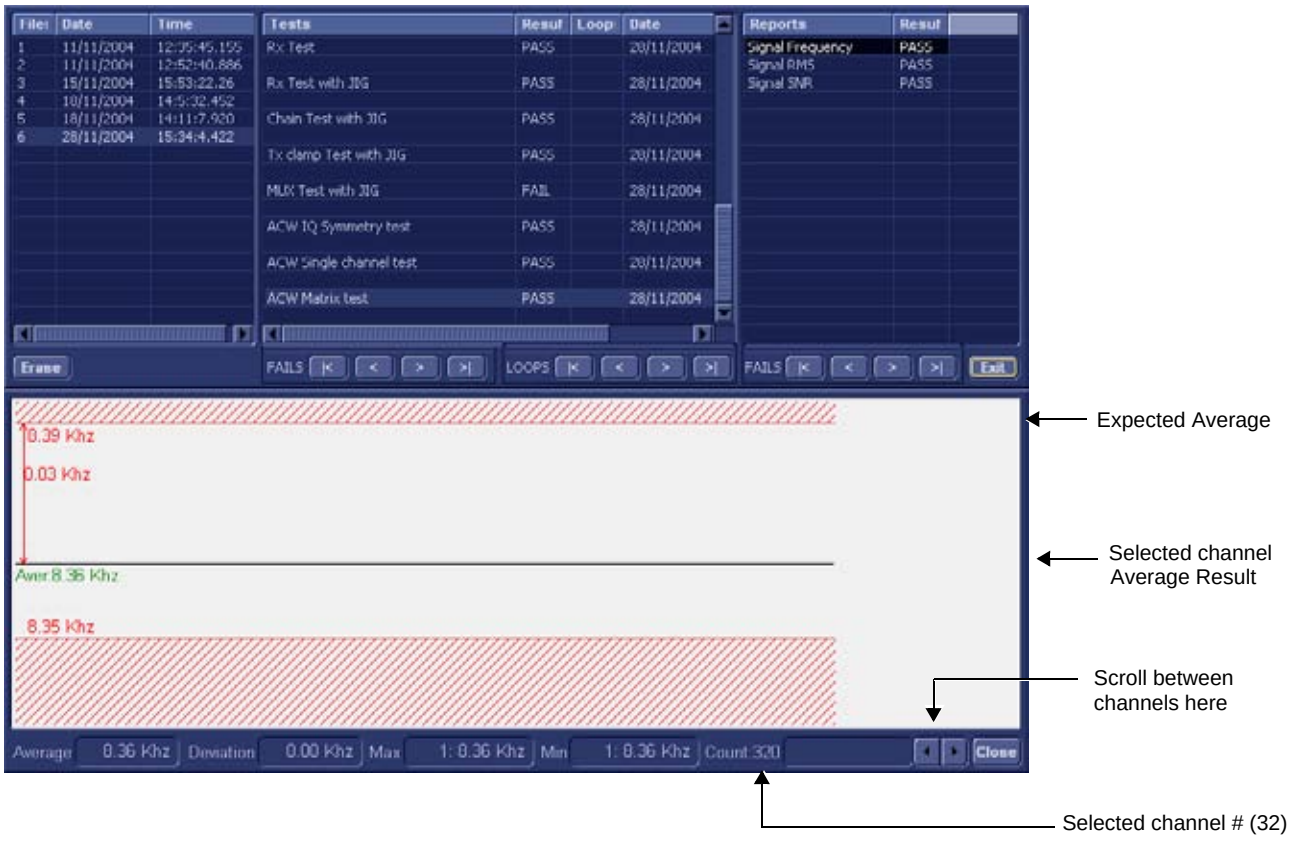


Figure 7-38 View Test Log - ACW Matrix Test - Signal Frequency

Note: The ACW Matrix Test test has three test reports (*Signal Frequency, Signal RMS,* and *Signal SNR*) which are listed in the *Reports* window on the right. By default, the *Signal Frequency* report is displayed in the Reports window below (Figure 7-38).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-38.

7) When done, trackball to the **Close** button and press **Set** to close the View Report window.

8) Select the second report (*Signal RMS*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-39.

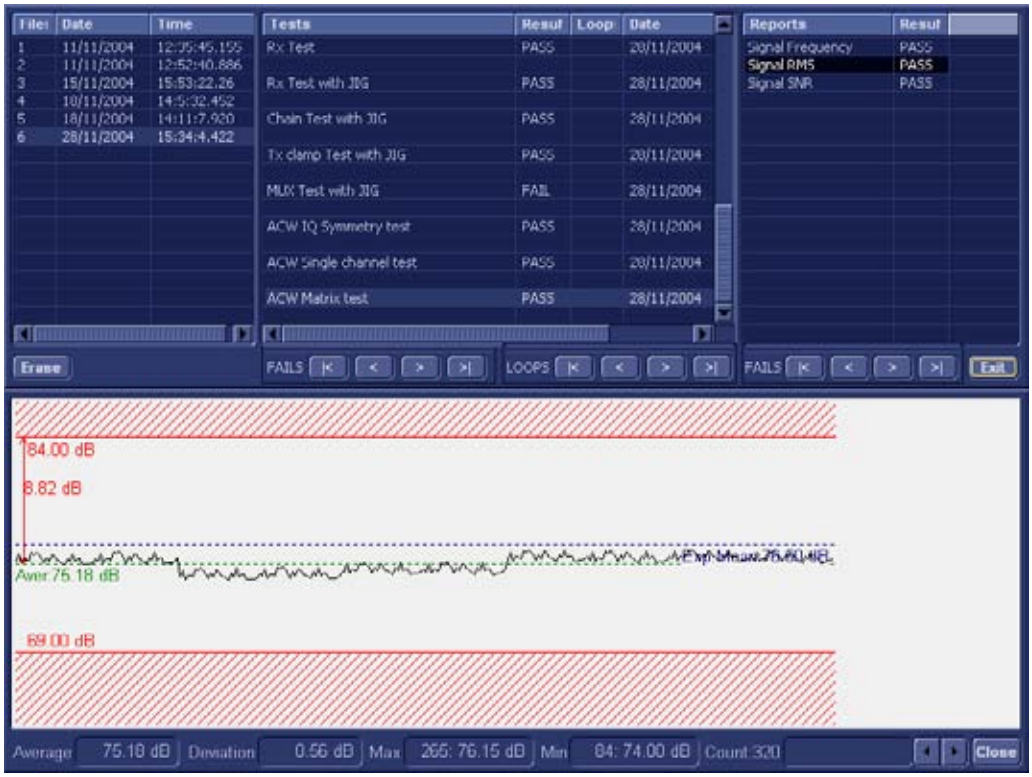


Figure 7-39 View Test Log - ACW Matrix Test - Signal RMS

9.) Use the tools provided to scroll through the channels and view the results, as previously described.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) Select the third report (*Signal SNR*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-40.

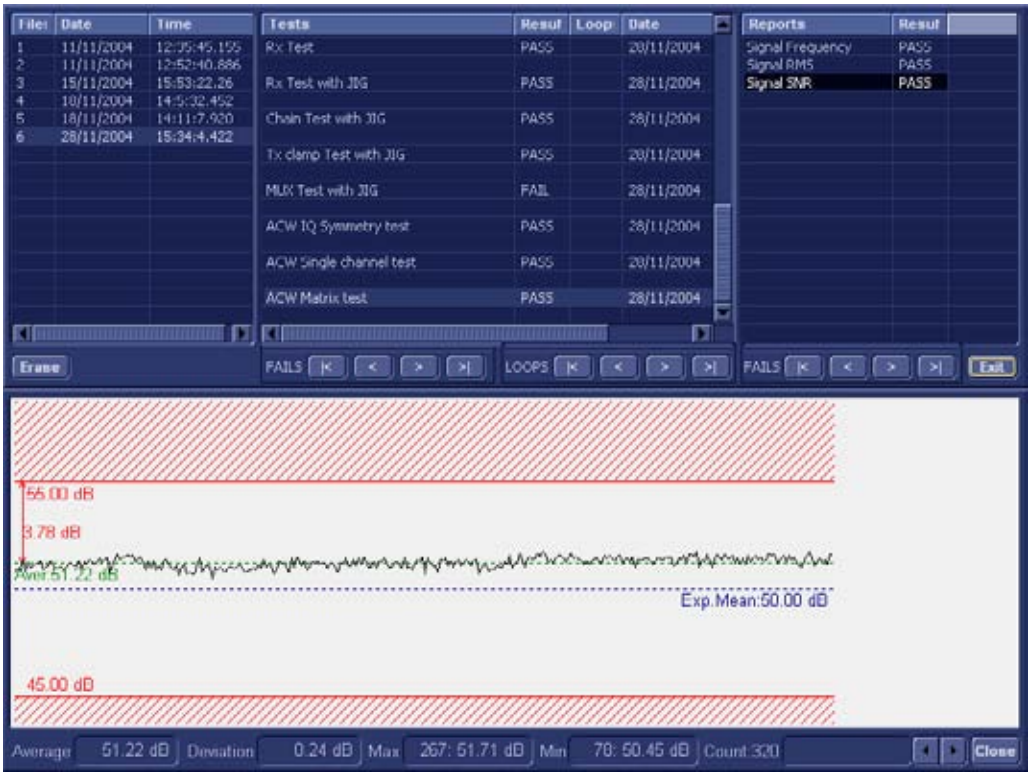


Figure 7-40 View Test Log - ACW Matrix Test - Signal SNR

12.) Use the tools provided to scroll through the channels and view the results, as previously described.

13) When done, trackball to the **Close** button and press **Set** to close the View Report window.

14) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in DC Offset Calibration on page 7 - 25
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

15.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

16.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5-2-3 ACW Delay Range Test

NOTE: For a description of this test, refer to the information in ACW Delay Range Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

IMPORTANT It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in DC Offset Calibration on page 7 - 25.

1.) In the *Diagnostic Test* window, trackball to **ACW Delay Range Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-41 below) and press **Set**. The ACW Delay Range Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

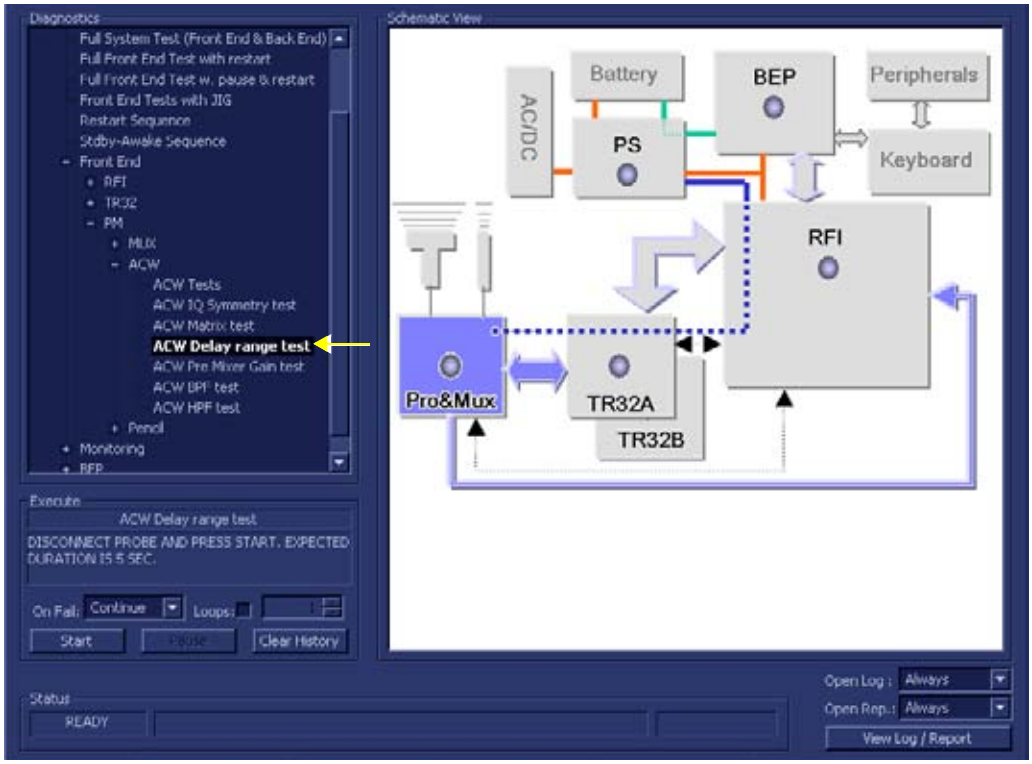


Figure 7-41 ACW Delay Range Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW Delay Range Test commences. While the test proceeds, the name of the test currently in progress (ACW IQ Delay Range Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW Delay Range Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-42.

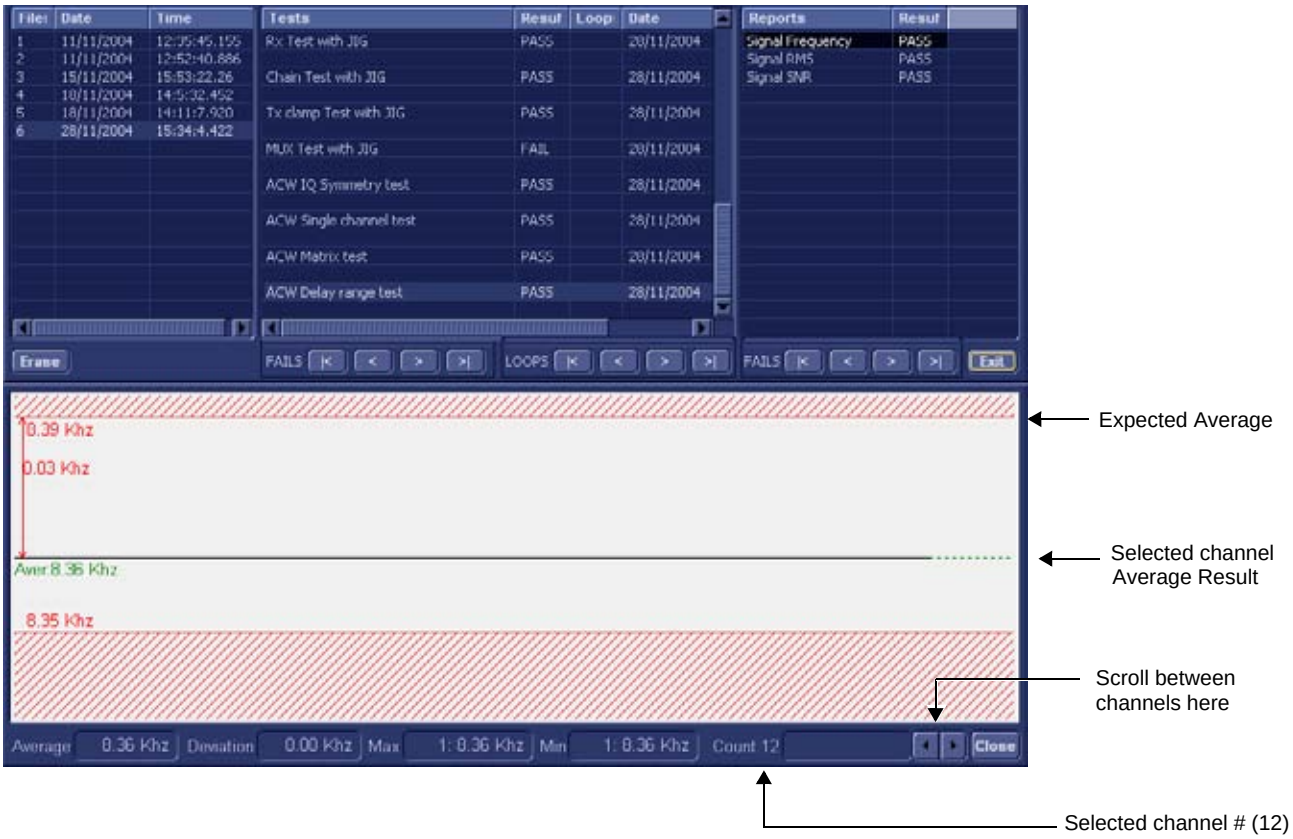


Figure 7-42 View Test Log - ACW Delay Range Test - Signal Frequency

Note: The ACW Delay Range Test test has three test reports (*Signal Frequency, Signal RMS,* and *Signal SNR*) which are listed in the *Reports* window on the right. By default, the *Signal Frequency* report is displayed in the Reports window below (Figure 7-42).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-42.

7) When done, trackball to the **Close** button and press **Set** to close the View Report window.

8) Select the second report (*Signal RMS*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-43.

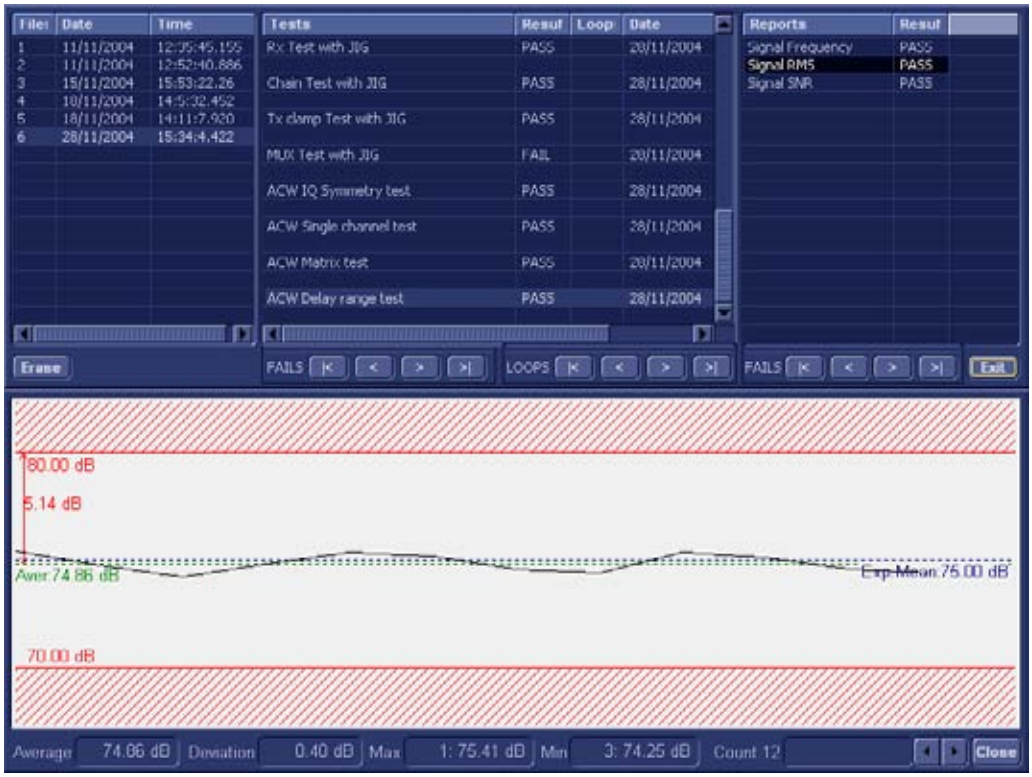


Figure 7-43 View Test Log - ACW Delay Range Test - Signal RMS

9.) Use the tools provided to scroll through the channels and view the results, as previously described.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) Select the third report (*Signal SNR*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-44.

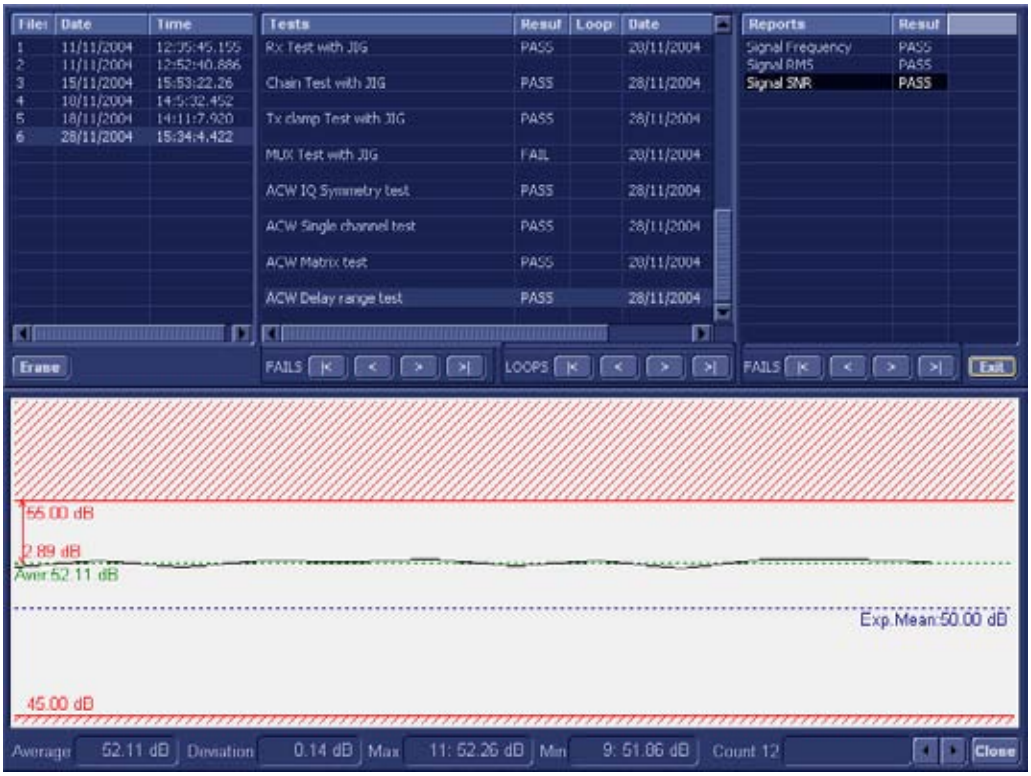


Figure 7-44 View Test Log - ACW Delay Range Test - Signal SNR

12.) Use the tools provided to scroll through the channels and view the results, as previously described.

13) When done, trackball to the **Close** button and press **Set** to close the View Report window.

14) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in DC Offset Calibration on page 7 - 25.
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

15.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

16.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5-2-4 ACW Pre-Mixer Gain Test

NOTE: For a description of this test, refer to the information in ACW Pre-Mixer Gain Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

IMPORTANT It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in DC Offset Calibration on page 7 - 25.

1.) In the *Diagnostic Test* window, trackball to **ACW Pre-Mixer Gain Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-45 below) and press **Set**. The ACW Pre-Mixer Gain Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

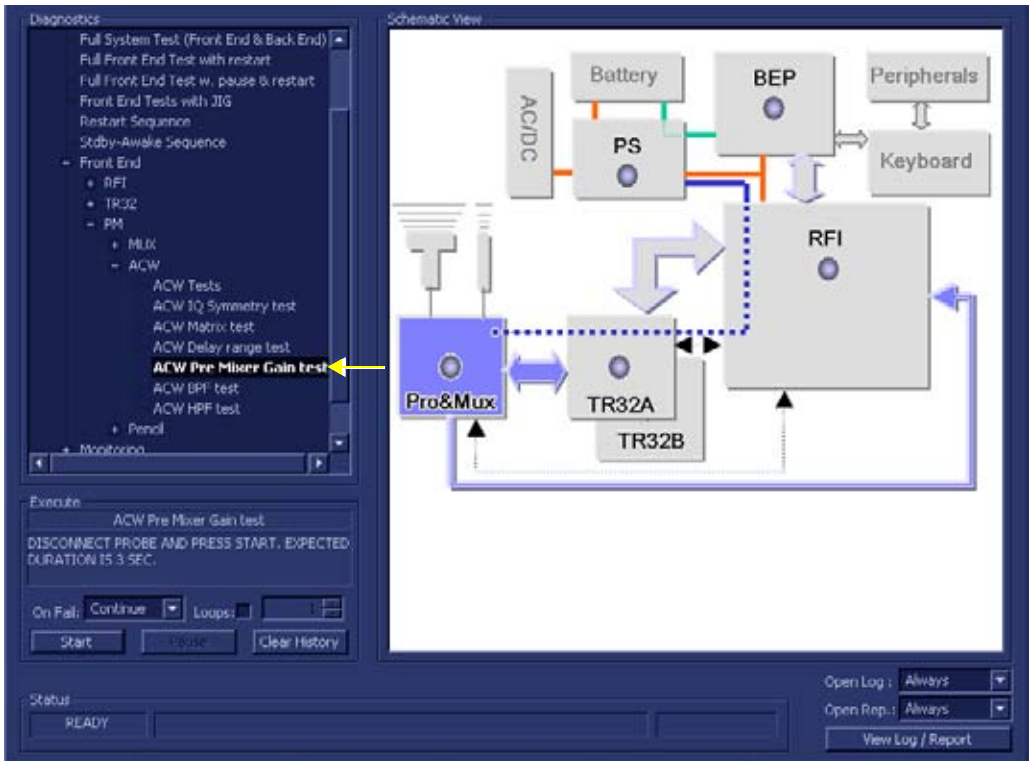


Figure 7-45 ACW Pre-Mixer Gain Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW Pre-Mixer Gain Test commences. While the test proceeds, the name of the test currently in progress (ACW Pre-Mixer Gain Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW Pre-Mixer Gain Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-46.

Figure 7-46 View Test Log - ACW Pre-Mixer Gain Test

Note: The ACW Pre-Mixer Gain Test has one test report. By default, this is displayed in the Reports window below (Figure 7-46).

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in DC Offset Calibration on page 7 - 25.
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If "Fail" appears in one of the Result columns, the test has failed, even if "Pass" appears in other columns. Repeat the ACW Pre-mixer Gain Test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5-2-5 ACW BPF Test

NOTE: For a description of this test, refer to the information in ACW BPF Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

IMPORTANT It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in DC Offset Calibration on page 7 - 25.

1.) In the *Diagnostic Test* window, trackball to **ACW BPF Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-47 below) and press **Set**. The ACW BPF Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

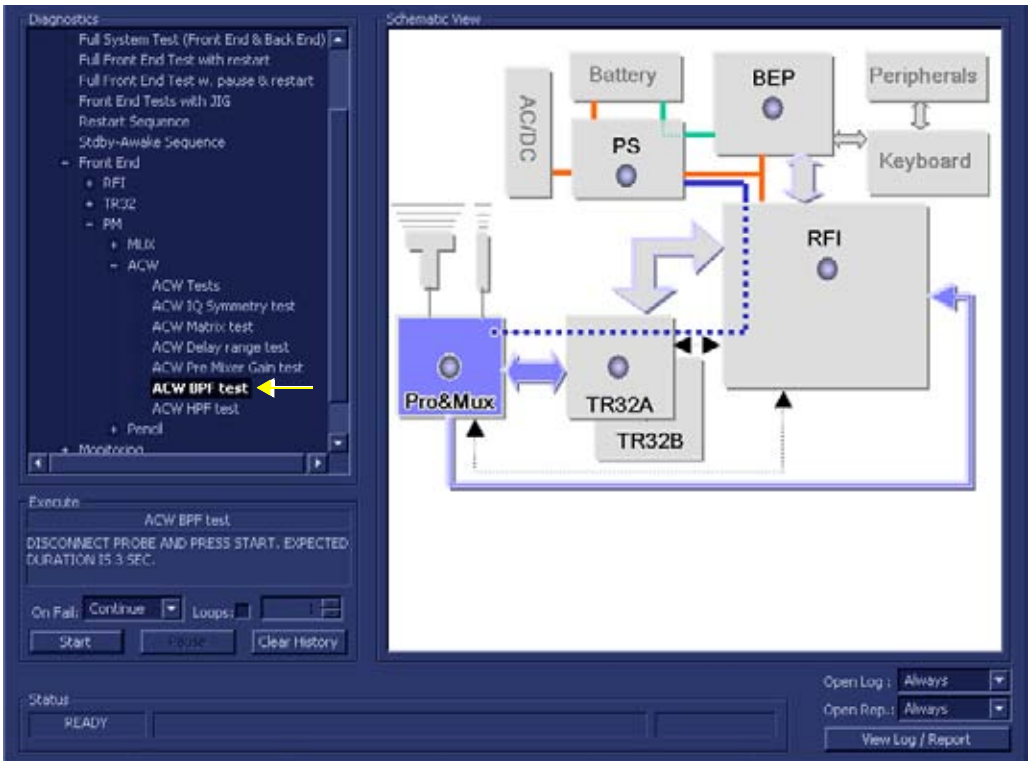


Figure 7-47 ACW BPF Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW BPF Test commences. While the test proceeds, the name of the test currently in progress (ACW BPF Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW BPF Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-48.

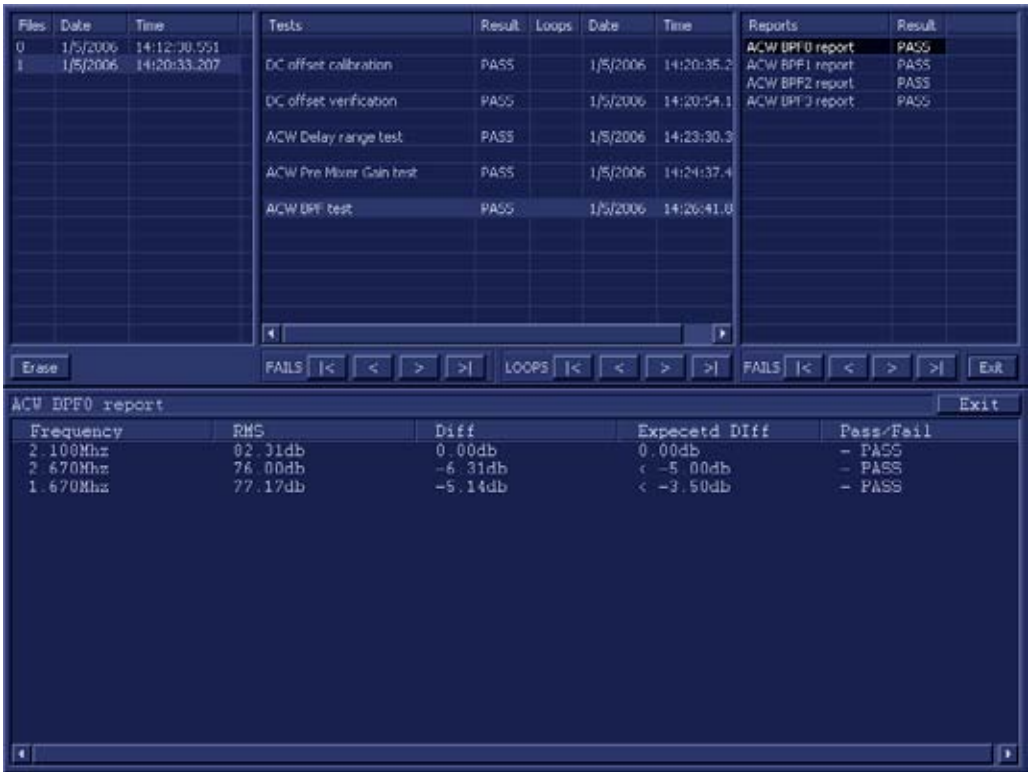


Figure 7-48 View Test Log - ACW BPF Test - BPF0

Note: The ACW BPF Test has four test reports (*BPF0*, *BPF1, BPF2,* and *BPF3*) which are listed in the *Reports* window on the right. By default, the *BPF0* report is displayed in the Reports window below (Figure 7-48).

7) When finished reviewing the first report, trackball to the **Exit** button and press **Set** to close the View Report window.

8) Select the second report (*BPF1*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-49.

Figure 7-49 View Test Log - ACW BPF Test - BPF1

9.) Use the tools provided to scroll through the channels and view the results, as previously described.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) Select the third report (*BPF2*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-50.

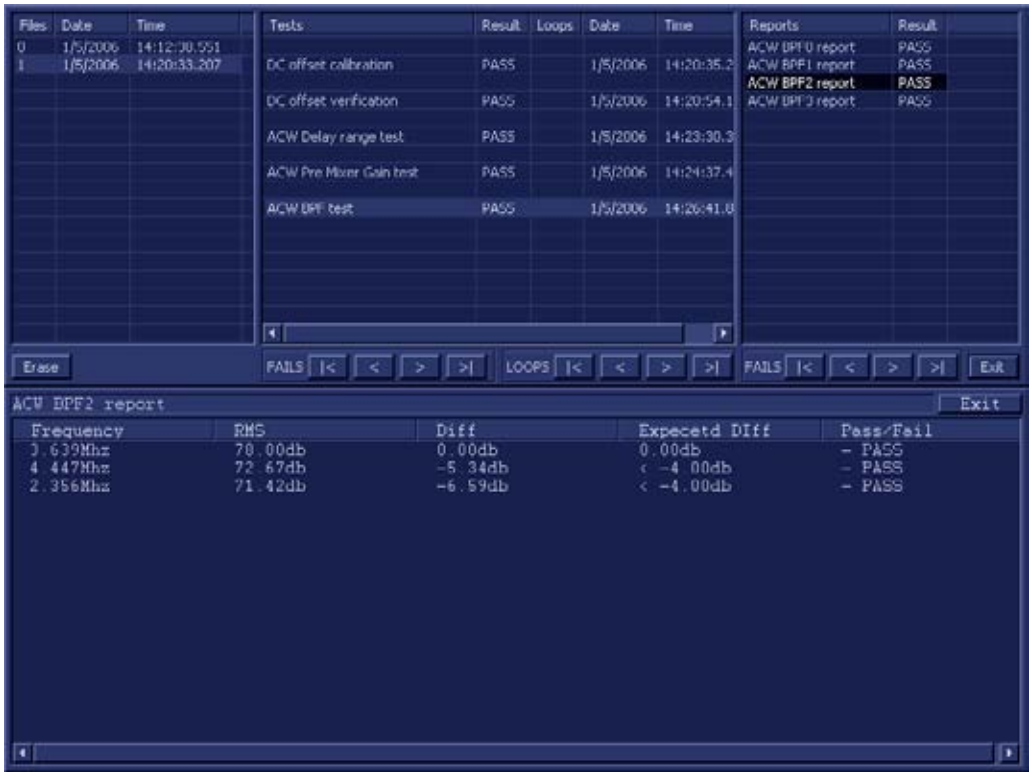


Figure 7-50 View Test Log - ACW BPF Test - BPF2

12.) Use the tools provided to scroll through the channels and view the results, as previously described.

13) When done, trackball to the **Close** button and press **Set** to close the View Report window.

14) Select the fourth report (*Signal SNR*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-51.

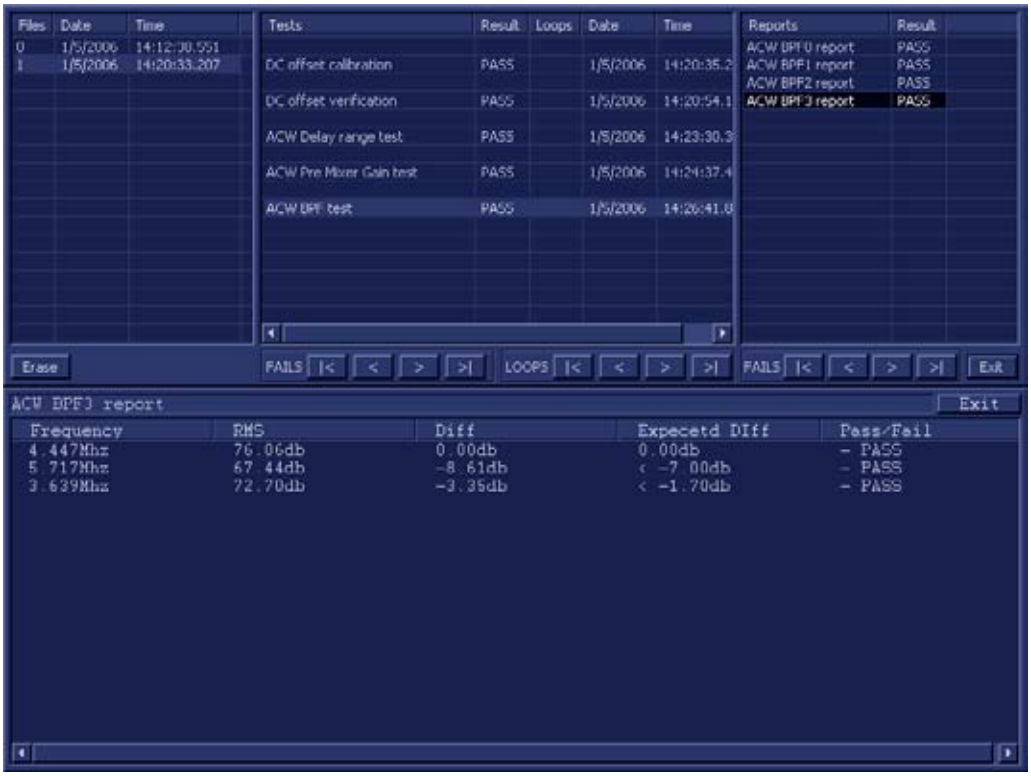


Figure 7-51 View Test Log - ACW BPF Test - BPF3

15.) Use the tools provided to scroll through the channels and view the results, as previously described.

16) When done, trackball to the **Close** button and press **Set** to close the View Report window.

17) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in DC Offset Calibration on page 7 - 25.
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

18.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

19.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5-2-6 ACW HPF Test

NOTE: For a description of this test, refer to the information in ACW HPF Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

IMPORTANT It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in DC Offset Calibration on page 7 - 25.

1.) In the *Diagnostic Test* window, trackball to **ACW HPF Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-52 below) and press **Set**. The ACW HPF Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

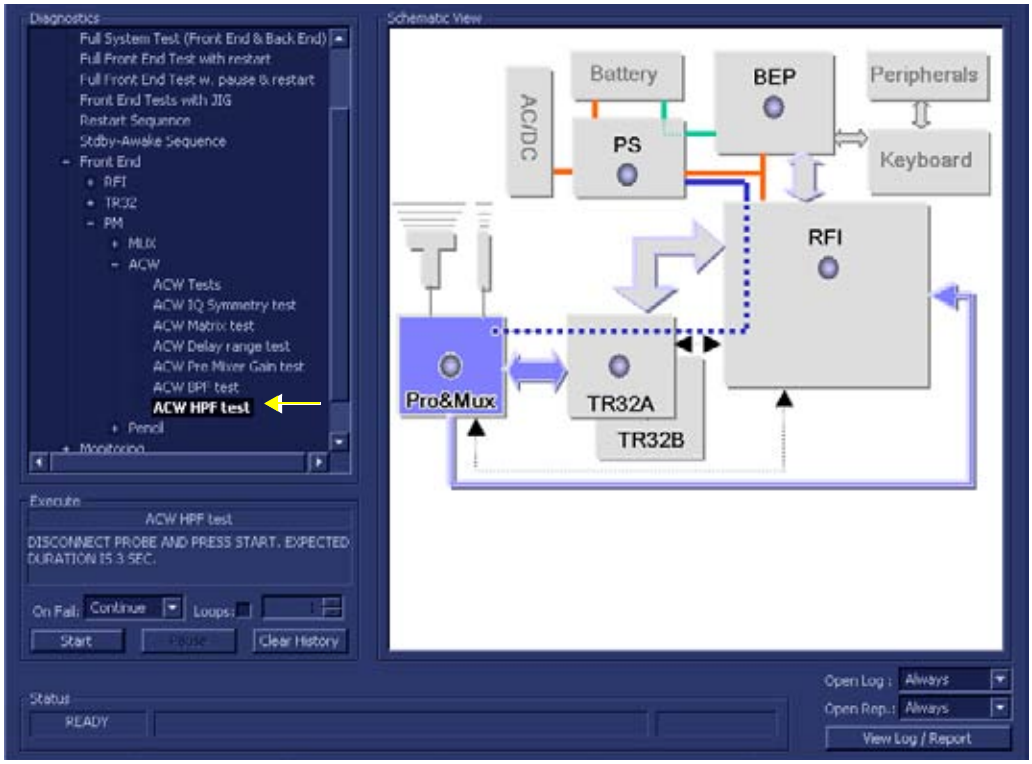


Figure 7-52 ACW HPF Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW HPF Test commences. While the test proceeds, the name of the test currently in progress (ACW HPF Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW HPF Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-53.

Figure 7-53 View Test Log - ACW HPF Test - 300

Note: The ACW HPF Test has two test reports (*HPF300* and *HPF600*) which are listed in the *Reports* window on the right. By default, the *HPF300* report is displayed in the Reports window below (Figure 7-53).

7) When finished reviewing the first report, trackball to the **Exit** button and press **Set** to close the View Report window.

8) Select the second report (*HPF600*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-54.

Figure 7-54 View Test Log - ACW HPF Test - 600

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in DC Offset Calibration on page 7 - 25.
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5-3 Pencil Test

7-4-5-3-1 Pencil Rx Test

NOTE: For a description of this test, refer to the information in Pencil Rx Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **Pencil RX Test** in the list of *Pencil* tests available for selection from the Diagnostic Test Tree (see Figure 7-55 below) and press **Set**. The Pencil RX Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (P&M), as shown below:

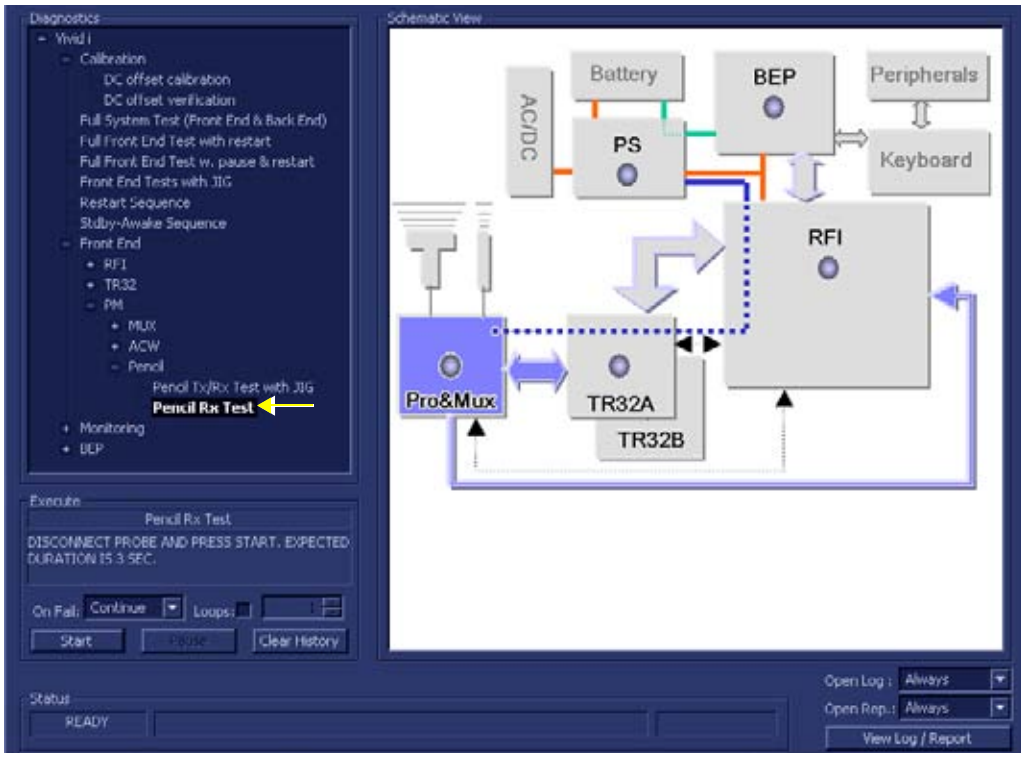


Figure 7-55 Pencil RX Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Pencil RX Test commences. While the test proceeds, the name of the test currently in progress (Pencil RX Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Pencil RX Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-56.

Figure 7-56 View Test Log - Pencil RX Test

Note: The Pencil RX Test has one test report which is listed in *Reports* on the right and displayed in the Reports window below (Figure 7-56).

8) When finished reviewing the first report, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when

prompted).

- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-5
Monitoring Tests

7-5-1 Accessing the Monitoring Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the *Accessing the Front End Diagnostic Options* section, on page 7-25.

7-5-1-1 Full System Monitoring Test

NOTE: For a description of this test, refer to the information in Full System Monitoring Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Full System Monitoring Test** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-57 below) and press **Set**. The Full System Monitoring Test name is displayed under *Execute;* all system components to be tested are highlighted light blue in the Schematic View, as shown below:

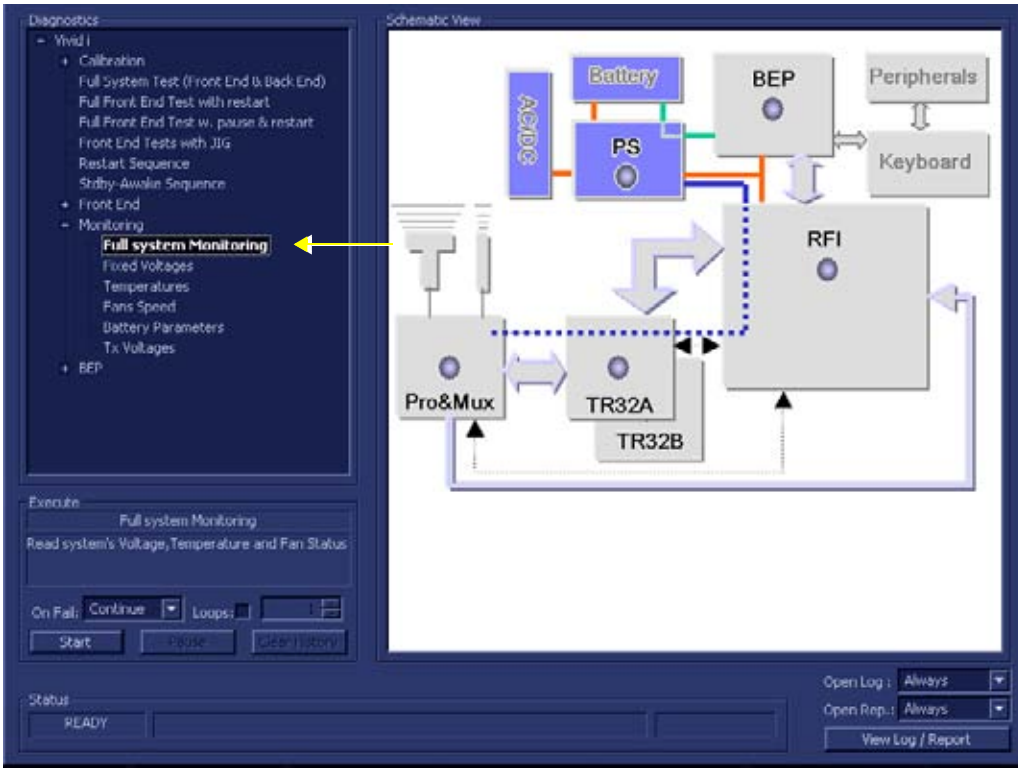


Figure 7-57 Full System Monitoring Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Full System Monitoring Test commences. While the test proceeds, the name of the test currently in progress (ADC Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full System Monitoring Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-58.

Figure 7-58 View Test Log - Full System Monitoring Test

Note: The Full System Monitoring Test has five sub-tests (*Fixed Voltages*, *Temperatures, Fans Speed, Battery Parameters, and Tx Voltages*). These are listed in the *Test* column, as shown in Figure 7-58.

8.) Select the first report (Fixed Voltages); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-59.

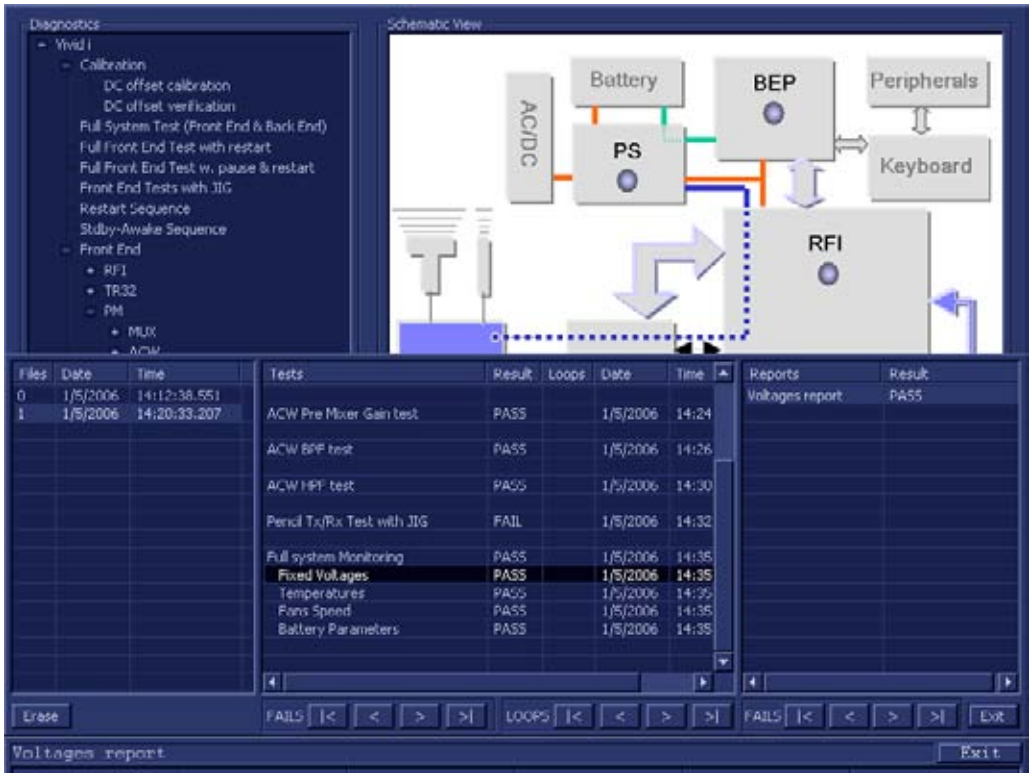


Figure 7-59 View Test Log - Full System Monitoring Test - Fixed Voltages

9.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-59.

10.) Select the second report (Temperatures); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-60.

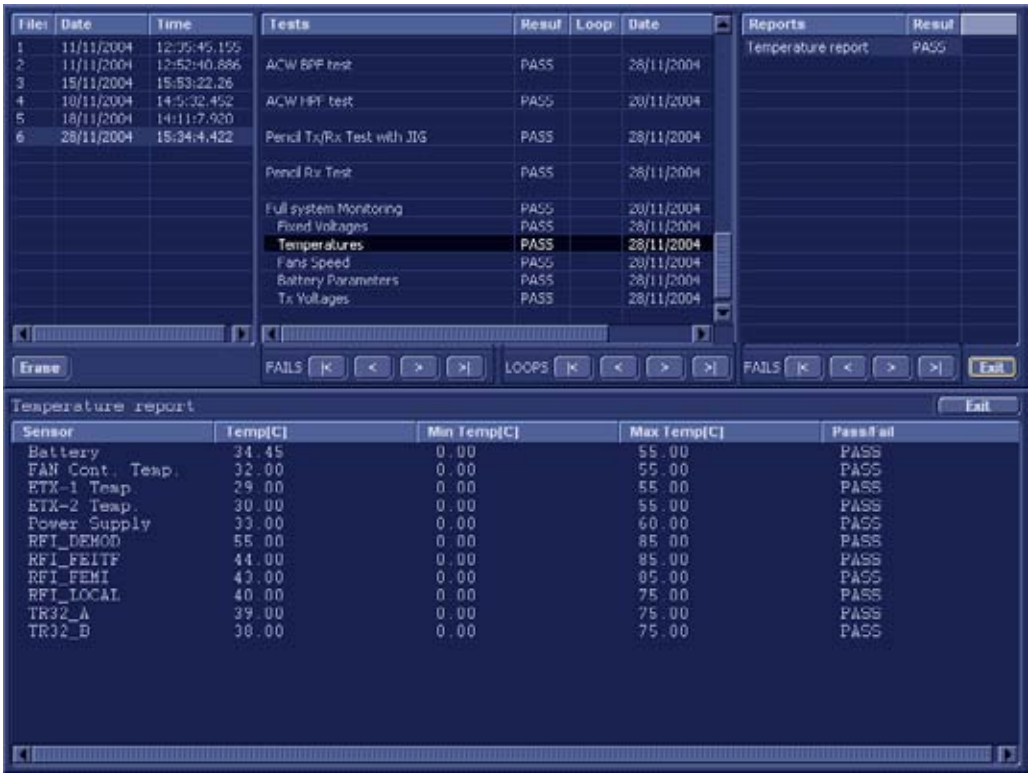


Figure 7-60 View Test Log - Full System Monitoring Test - Temperatures

11.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-60.

12.) Select the third report (Fans Speed); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-61.

Figure 7-61 View Test Log - Full System Monitoring Test - Fans Speed

13.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-59.

14.) Select the fourth report (Battery Parameters); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-62.

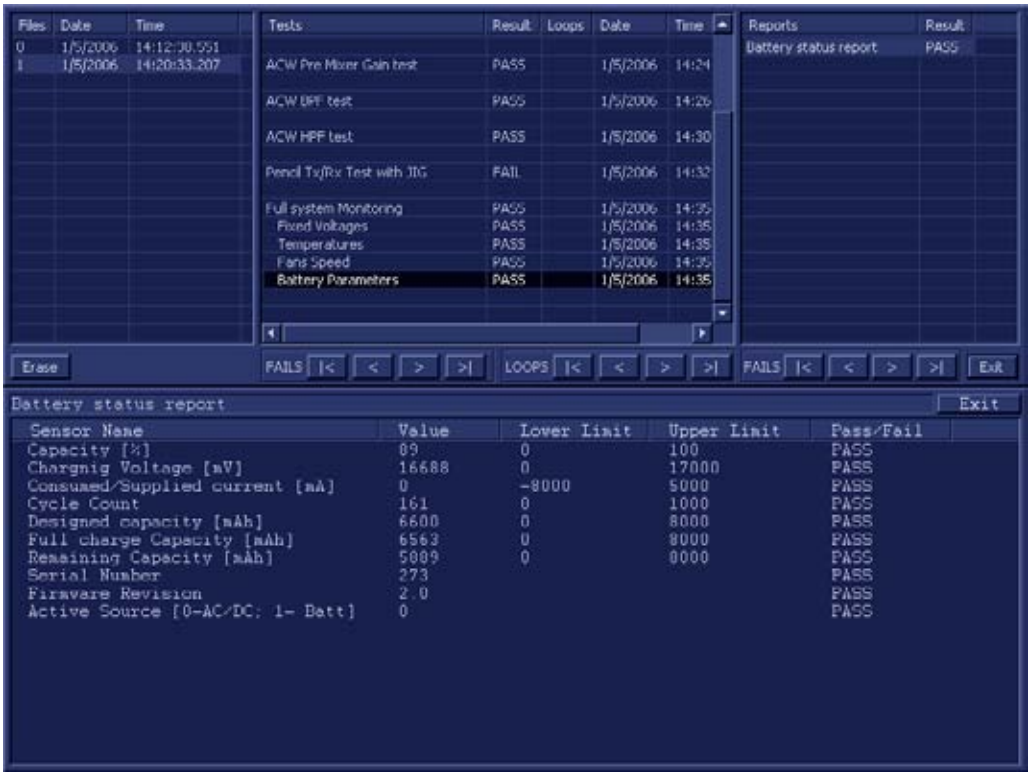

Files Date Time
0 1/5/2006 14:12:30.551
1 1/5/2006 14:20:33.207
Tests Result Loops Date Time
ACW Pre Mixer Gain test PASS 1/5/2006 14:24
ACW LPF test PASS 1/5/2006 14:26
ACW HPF test PASS 1/5/2006 14:30
Pencil Tx/Rx Test with JIG FAIL 1/5/2006 14:32
Full system Monitoring PASS 1/5/2006 14:35
Fixed Voltages PASS 1/5/2006 14:35
Temperatures PASS 1/5/2006 14:35
Fans Speed PASS 1/5/2006 14:35
Battery Parameters PASS 1/5/2006 14:35
Reports Result
Battery status report PASS
Erase
FAILS
LOOPS
FAILS
Exit
Battery status report
Sensor Name Value Lower Limit Upper Limit Pass/Fail
Capacity [%] 89 0 100 PASS
Chargnig Voltage [mV] 16688 0 17000 PASS
Consumed/Supplied current [mA] 0 -8000 5000 PASS
Cycle Count 161 0 1000 PASS
Designed capacity [mAh] 6600 0 8000 PASS
Full charge Capacity [mAh] 6563 0 8000 PASS
Remaining Capacity [mAh] 5089 0 0000 PASS
Serial Number 273 PASS
Firmware Revision 2.0 PASS
Active Source [0-AC/DC; 1- Batt] 0 PASS

Figure 7-62 View Test Log - Full System Monitoring Test - Battery Parameters

15.) Check that the sub-test passed and that result values are within the pre-defined *Upper* and *Lower* limits, as shown in Figure 7-62.

16.) Select the fifth report (Tx Voltages); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-63.

Figure 7-63 View Test Log - Full System Monitoring Test - Tx Voltages

17.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-63.

18) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

19) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

20.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

21.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-2 Fixed Voltages Test

NOTE: For a description of this test, refer to the information in Fixed Voltages Test on page 7 - 13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Fixed Voltages** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-64 below) and press **Set**. The Fixed Voltages Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

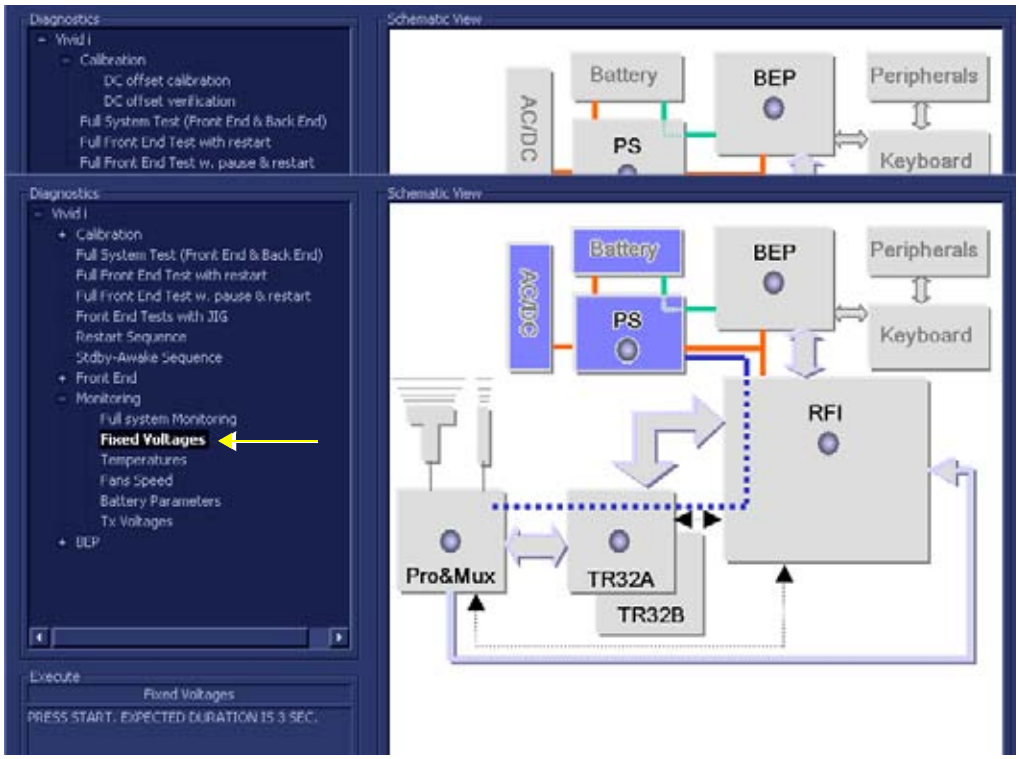


Figure 7-64 Voltages Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Fixed Voltages Test commences. While the test proceeds, the name of the test currently in progress (Fixed Voltages) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Fixed Voltages Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-65.

Diagnostics
Vivid i
Calibration
DC offset calibration
DC offset verification
Full System Test (Front End & Back End)
Full Front End Test with restart
Full Front End Test w. pause & restart
Schematic View
Battery
BEP
Peripherals
AC/DC
PS
Keyboard
Files Date Time
0 1/5/2006 14:12:38.551
1 1/5/2006 14:20:33.207
Tests Result Loops Date Time
ACW LPF test PASS 1/5/2006 14:26
ACW HPF test PASS 1/5/2006 14:30
Pencil Tx/Rx Test with JIG FAIL 1/5/2006 14:32
Full system Monitoring PASS 1/5/2006 14:35
Fixed Voltages PASS 1/5/2006 14:35
Temperatures PASS 1/5/2006 14:35
Fans Speed PASS 1/5/2006 14:35
Battery Parameters PASS 1/5/2006 14:35
Fixed Voltages PASS 1/5/2006 14:46
Reports Result
Voltages report PASS
Erase
FAILS
LOOPS
FAILS
Exit
Voltages report
Exit
Voltage Name Value[V] Min Limit[V] Expected[V] Max Limit[V] Pass/Fail
SHV (80V) 78.06 70.00 80.00 90.00 PASS
12V 11.03 10.00 12.00 13.20 PASS
12V Digital 11.83 10.80 12.00 13.20 PASS
1.8V 1.80 1.30 1.80 2.00 PASS
3.3V 3.34 2.50 3.30 3.50 PASS
3.3V Standby 3.48 2.50 3.30 3.50 PASS
5V Analog 4.93 4.00 5.00 5.40 PASS
5V Digital 5.00 4.00 5.00 5.40 PASS
5V Standby 5.21 4.00 5.00 5.40 PASS

Figure 7-65 View Test Log - Fixed Voltages Test

Note: For this test, there is one report (Voltages) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-65.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.

- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-3 Temperatures Test

NOTE: *For a description of this test, refer to the information in Temperatures Test on page 7 - 14.*

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Temperatures** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-66 below) and press **Set**. The Temperatures Test name is displayed under *Execute;* all system components (excluding the P&M) will be tested are highlighted light blue in the Schematic View (all), as shown below:

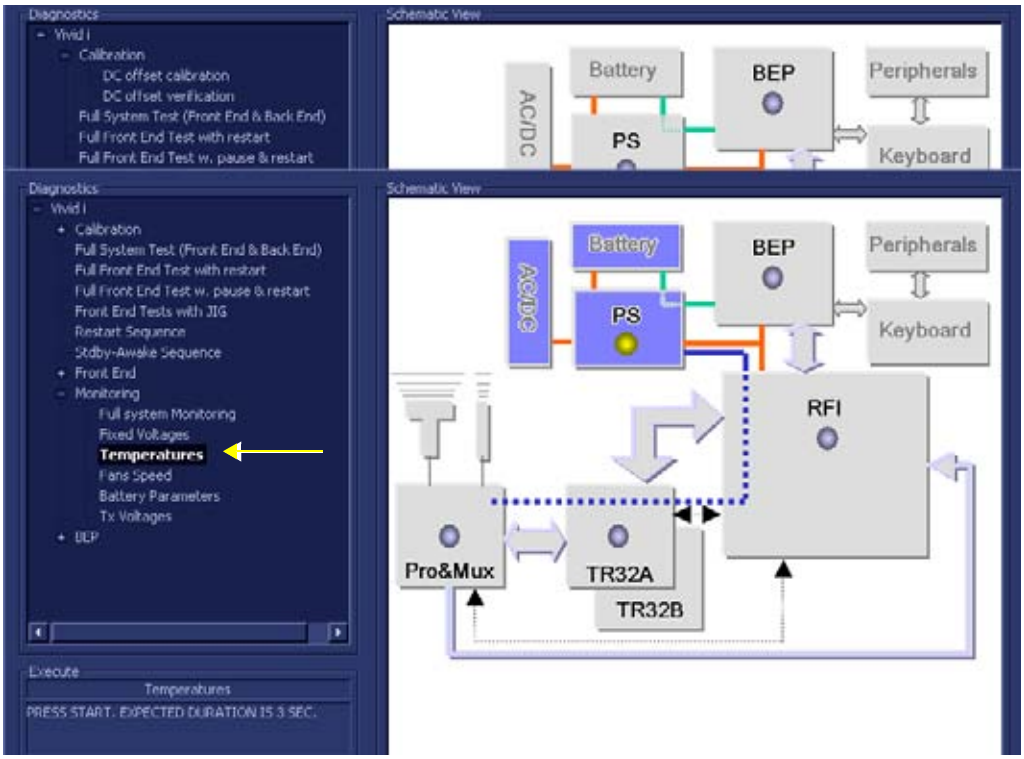


Figure 7-66 Temperatures Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Temperatures Test commences. While the test proceeds, the name of the test currently in progress (Temperatures) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Temperatures Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-67.

Figure 7-67 View Test Log - Temperatures Test

Note: For this test, there is one report (Temperatures) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-67.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-4 Fans Speed Test

NOTE: For a description of this test, refer to the information in Fans Speed Test on page 7 - 14.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Fans Speed** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-68 below) and press **Set**. The Fans Speed Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

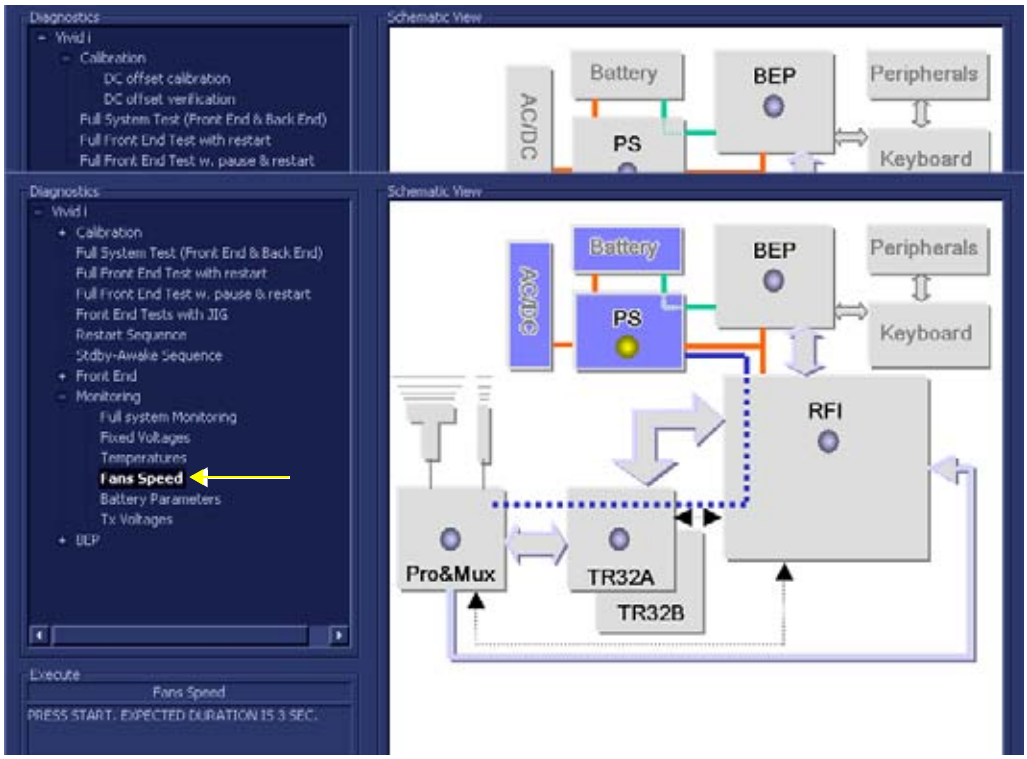


Figure 7-68 Fans Speed Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Fans Speed Test commences. While the test proceeds, the name of the test currently in progress (Fans Speed) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Fans Speed Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-69.

Figure 7-69 View Test Log - Fans Speed Test

Note: For this test, there is one report (Fans Status) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each fan are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-69.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If the test fails, repeat the Fan Speed Test.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.

- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-5 Battery Parameters Test

NOTE: *For a description of this test, refer to the information in Battery Parameters Test on page 7 - 14.*

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Battery Parameters** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-70 below) and press **Set**. The Battery Parameters Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

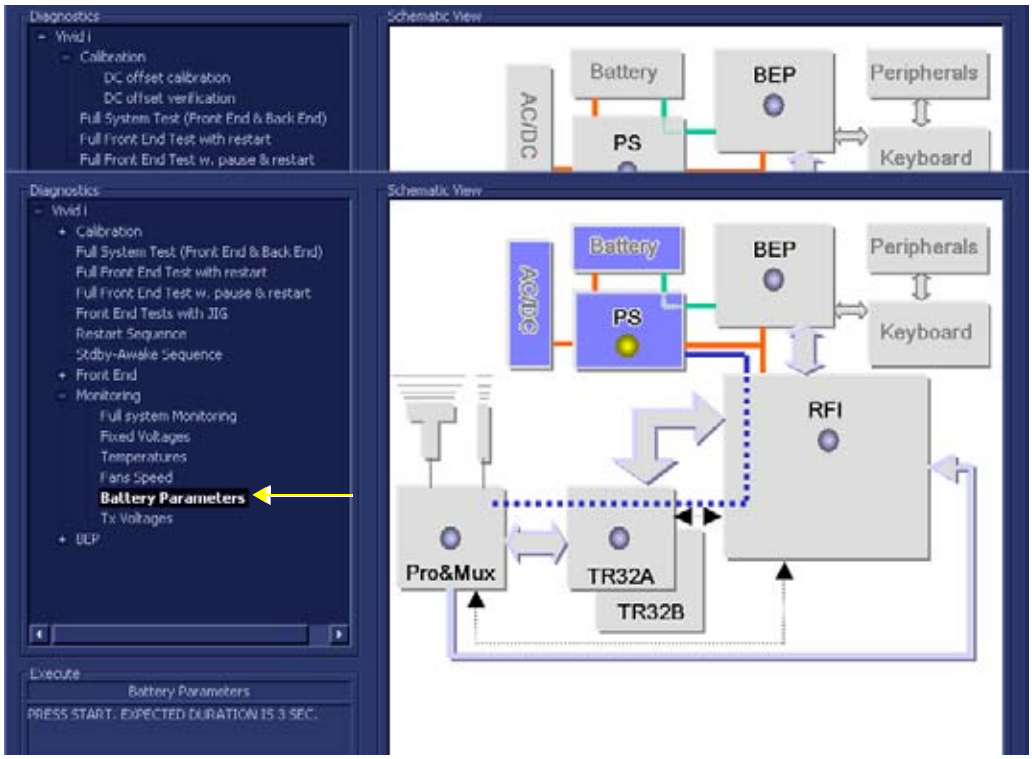


Figure 7-70 Battery Parameters Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Battery Parameters Test commences. While the test proceeds, the name of the test currently in progress (Battery Parameters) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Battery Parameters Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-71.

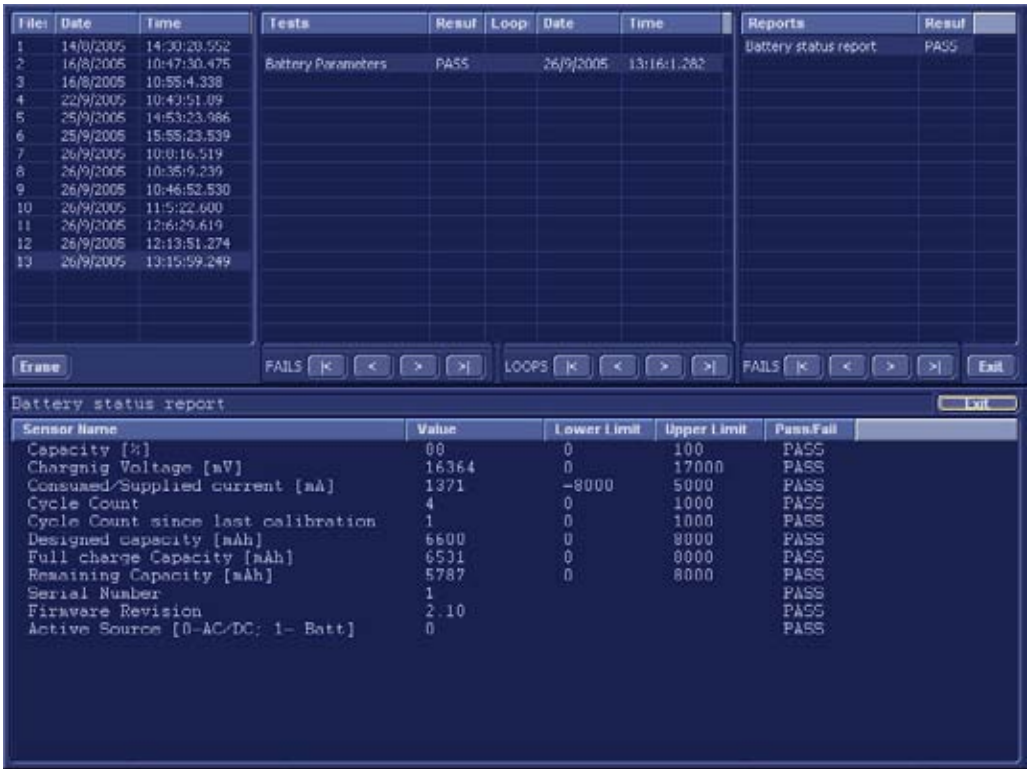


Figure 7-71 View Test Log - Battery Parameters Test

Note: For this test, there is one report (Battery Status) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each sensor are within the pre-defined *Lower* and *Upper* limits, as shown in Figure 7-71.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).

- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.
- If the test fails again, repeat the Fan Speed Test.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-6 Tx Voltages Test

NOTE: For a description of this test, refer to the information in Tx Voltages Test on page 7 - 14.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Tx Voltages** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-72 below) and press **Set**. The Tx Voltages Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

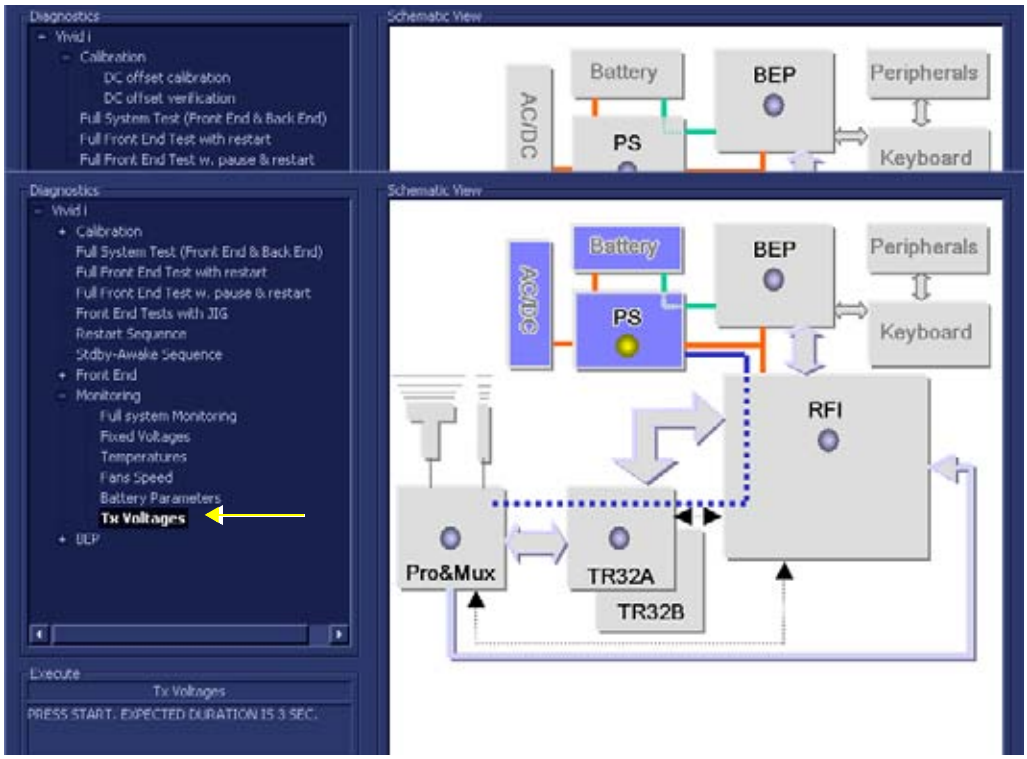


Figure 7-72 Tx Voltages Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Tx Voltages Test commences. While the test proceeds, the name of the test currently in progress (Tx Voltages) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Tx Voltages Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-73.

Figure 7-73 View Test Log - Tx Voltages Test

Note: For this test, there is one report (Tx Voltages) which is listed in the *Reports* window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each fan are within the pre-defined *Max* and *Min* voltage limits, as shown in Figure 7-73.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).

- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified but the results were very close to the upper or lower limits, perform calibration, as described in DC Offset Calibration on page 7 - 25, and then repeat the test.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-6
Performing Back End Diagnostics on the System

The Back End Diagnostics Tests enable you to test the functionality of various Back End hardware components.

Note: The Back End Diagnostic Tests may be performed independently, regardless of sequence.

7-6-1 Accessing the Back End Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the *Accessing the Front End Diagnostic Options* section, on page 7-25.

7-6-1-1 Extended Keyboard Test

NOTE: For a description of this test, refer to the information in the Extended Keyboard Test on page 7 - 14.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Extended Keyboard Test** in the list of *BEP* tests available for selection from the Diagnostic Test Tree (see Figure 7-74 below) and press **Set**. The Extended Keyboard Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

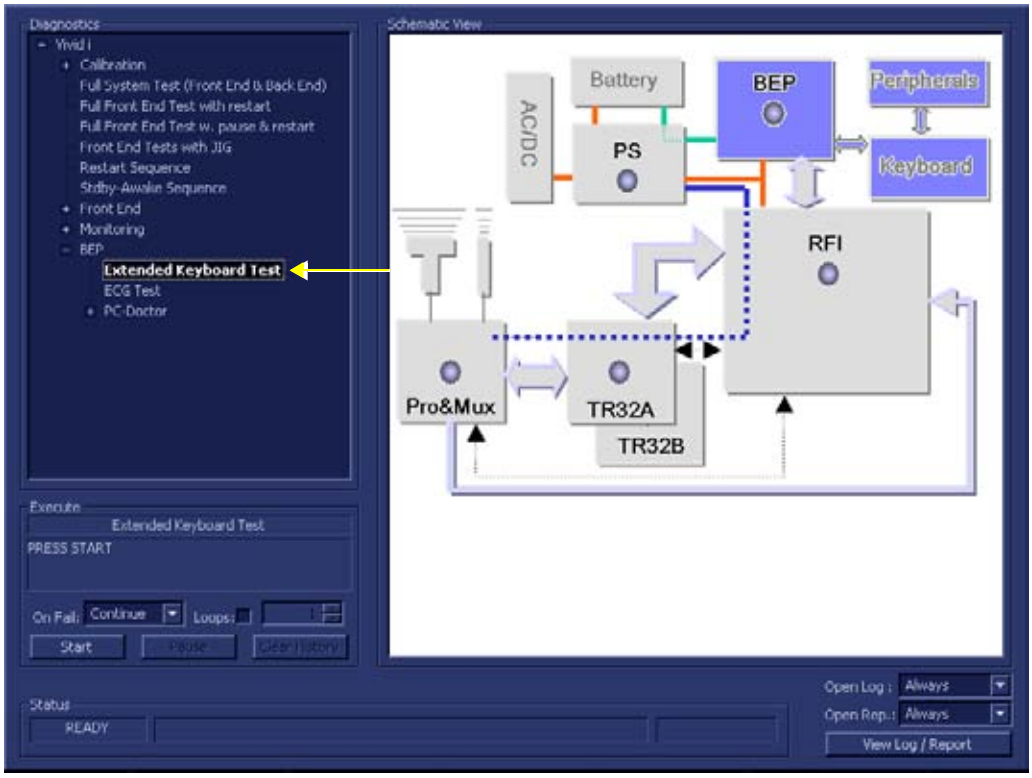


Figure 7-74 Extended Keyboard Test

2.) Trackball to the **Start** button and press **Set**.

The interactive Keyboard Test screen is displayed as shown below, enabling testing of the various external keyboard components.

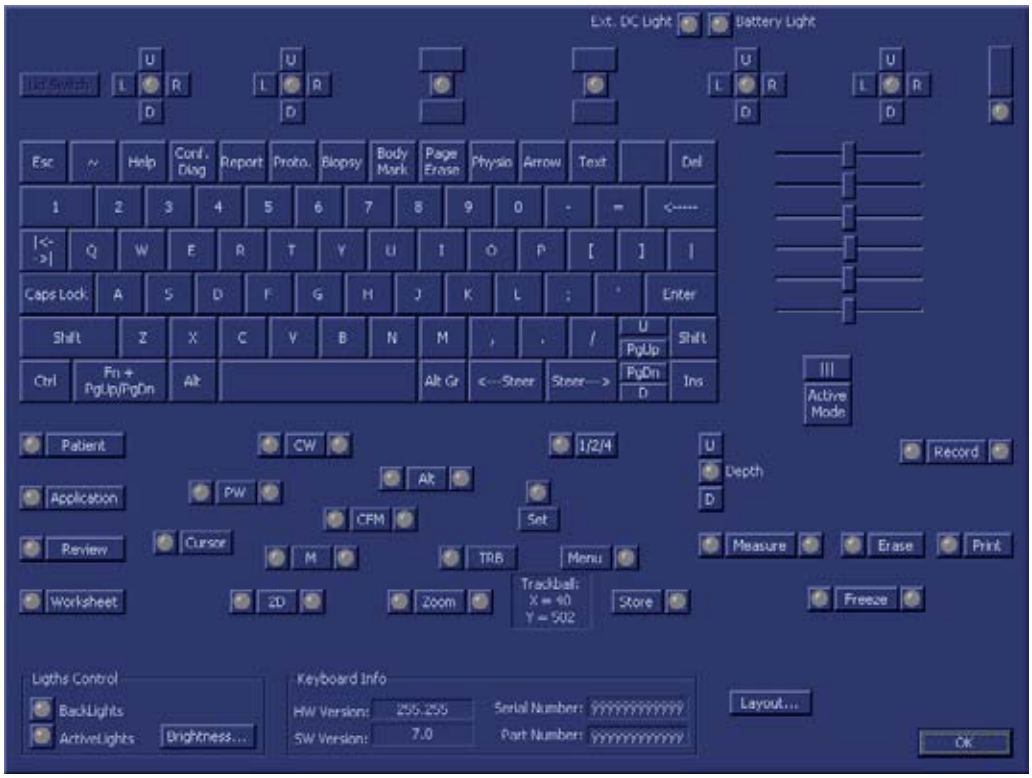


Figure 7-75 Extended Keyboard Test Screen

3.) Begin the test by checking the ATCG sliders as follows:

   a.) Move one of the ATGC sliders while inspecting the result displayed in the Extended Keyboard Test Screen (*right* side - Figure 7-75).

   b.) As you move the slider, the corresponding position displayed in the Test Screen will be seen to change, accordingly. Check it is possible to move the slider through its full range. Also, make sure that moving the slider has no influence on any of the other ATGC sliders above or below (i.e., all other sliders remain stationary).

4.) Repeat step 3 to test each of the other ATGC sliders.

5.) Check all keyboard keys, by pressing each in turn as follows:

   a.) Press one key; make sure the depressed key is shown as *depressed* in the Test Screen.

   b.) Release the key; make sure the released key is no longer showing as depressed in the Test Screen.

6.) Repeat step 5 to test each of the other keyboard keys.

7.) Repeat step 5 to test the following Trackball buttons: **Zoom**, **Trackball**, **Set**, **Update**, and **Store**.

8.) Repeat step 5 to check the Soft Menu keys (each in two directions). Make sure that the corresponding movement is shown in the Test Screen.

9.) Repeat step 5 to check the Soft Menu Rocker (in each of four directions). Make sure that the corresponding movement is shown in the Test Screen.

10.) Check the Gain rotary as follows:

a.) When turning the rotary in a *clockwise* direction, each time you hear a click, *right* arrows are displayed in the Test Screen.

b.) When turning in a *counter-clockwise* direction, each time you hear a click, *left* arrows are displayed in the Test Screen.

Note: When performing this step, make sure that a minimum of 32 clicks are heard when turning the Gain rotary in both the *clockwise* and *counter-clockwise* directions to ensure that a complete check is performed.

11.) Check the On/Off button.

a.) Press the button once; make sure the button is shown as depressed in the Test Screen.

b.) Release the button; make sure the button is no longer showing as depressed in the Test Screen.

12.) Check the Lights Control (Backlights and Active Lights), as follows:

a.) trackball to the Active Lights button (under *Lights Control*) and press **Set**. Make sure that all the corresponding LEDs are activated (illuminated green - *Patient*, *CW*, *Application*, *etc.*).

alternatively, check each one (one-by-one) individually.

b.) trackball to the Backlights button (under *Lights Control*) and press **Set**. Make sure that all the extended keyboard backlighting is correctly illuminated.

13.) Trackball to the Battery Light button (top *right* of Test Screen) and press **Set**. Make sure that all the corresponding LEDs is activated (illuminates green).

14.) Trackball to the Ext DC Light button (top *right* of Test Screen) and press **Set**. Make sure that all the corresponding LEDs is activated (illuminates green).

15) Perform the Trackball Test, as follows:

a.) Move the trackball; the position of the trackball cursor on the screen is reflected by a change in the displayed X and Y coordinate values.

Note:when the trackball cursor is positioned at the extreme top left of the screen:
X = 0 and Y = 0.

b.) As you move the trackball cursor, make sure the coordinate values *increase*/*decrease* in small steps, without jumping more than two or three digits. If for example, the values increment by steps of 10, this indicates that the trackball operation is faulty (possibly the trackball requires cleaning, or replacement).

16) When done with all the above tests, trackball to the **OK** button and press **Set.**

The View Test Log dialog box is displayed, as shown in Figure 7-76 below.

Figure 7-76 View Test Log - Extended Keyboard Test

17.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

18) Proceed as follows:

- If the test passed but the original problem persists, contact your local On-Line Center for assistance.

19.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-2 ECG Test

NOTE: For a description of this test, refer to the information in ECG Test on page 7 - 14.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) Connect the ECG cable to the input on the ECG port on the right side of the Vivid-i™/ Vivid-q™ scanner.

2.) Connect the ECG leads to yourself (as the simulated patient).

3.) In the *Diagnostic Test* window, trackball to **ECG Test** in the list of *BEP* tests available for selection from the Diagnostic Test Tree (see Figure 7-77 below) and press **Set**. The ECG Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

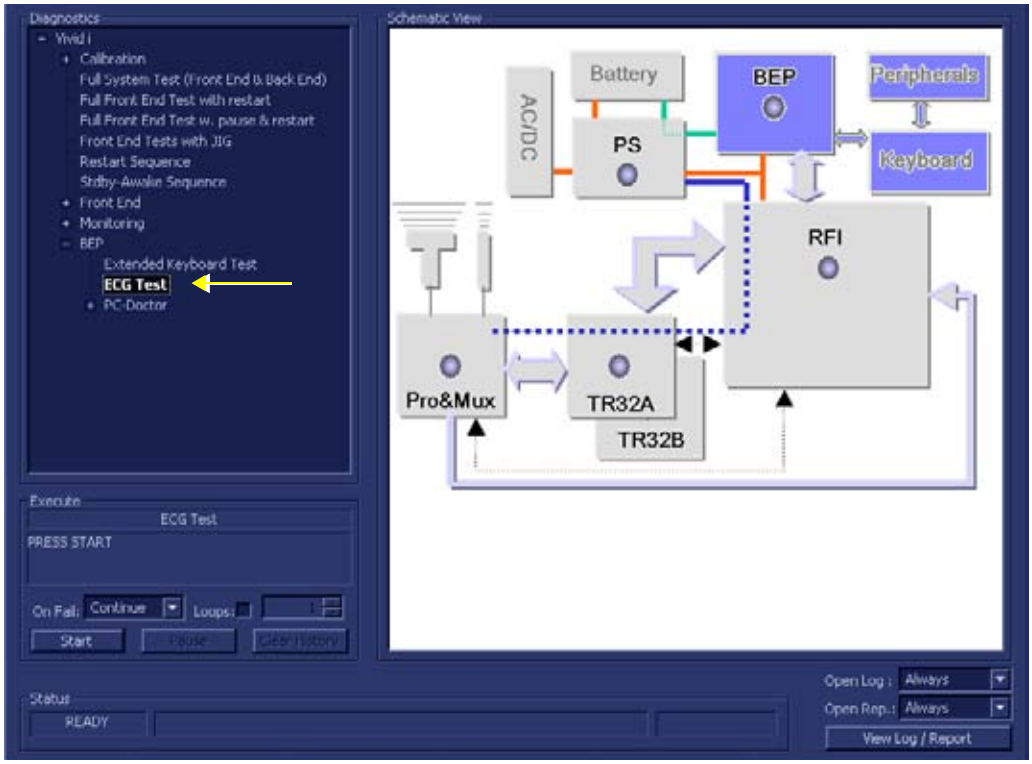


Figure 7-77 ECG Test

4.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

5.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

6.) Trackball to the **Start** button and press **Set**.

The interactive ECG Device Test screen is displayed as shown in Figure 7-78.

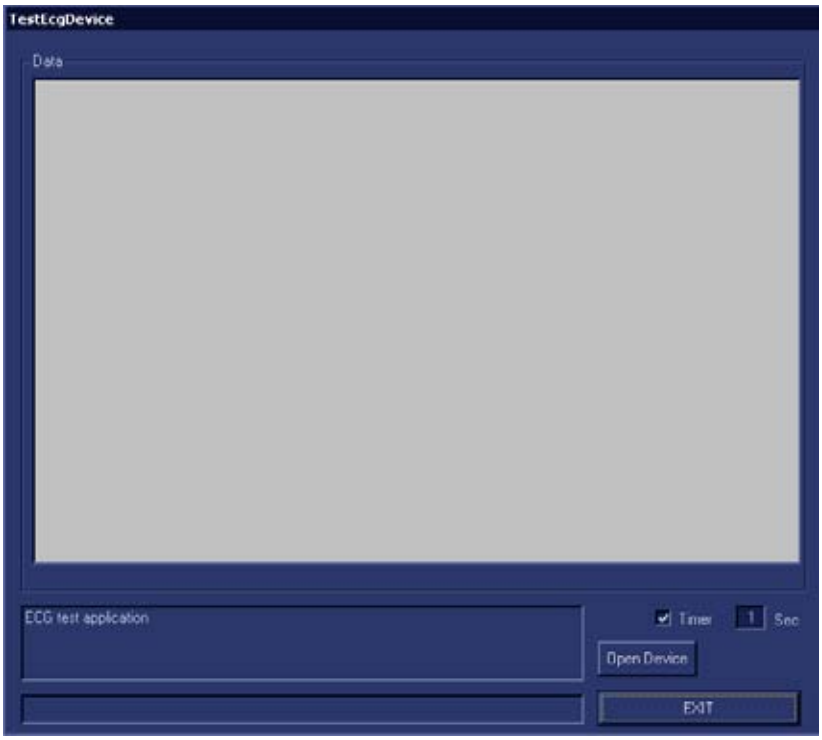


Figure 7-78 ECG Device Test Screen

7.) Make sure that the resolution scale is set to 1 Sec. (as shown in Figure 7-78, above).

8.) Trackball to the **Open Device** button and press **Set**.

The ECG signal is displayed in the Data area, as shown in the example below:

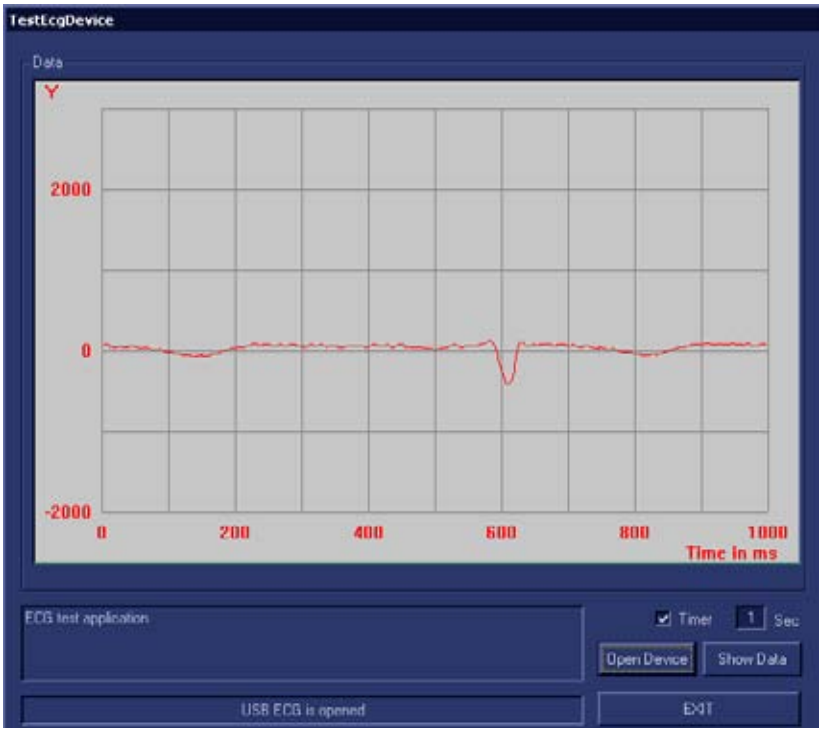


Figure 7-79 Test ECG - Data

9.) Verify that a single clear QRS signal is displayed on the screen, as shown in Figure 7-79.

10.) When done, trackball to the **Exit** button and press **Set**.

11.) When prompted by the following message, select **Yes** or **No** as applicable:

12) Proceed as follows:

- If the test passed but the original problem persists, contact your local On-Line Center for assistance.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3 PC Doctor

NOTE: For a complete description of all PC Doctor tests, refer to the information in PC Doctor on page 7 - 15.

This procedures in this section are divided into two groups. Refer to the relevant procedure, as follows:

- **Automatic Tests**
  - Full Back End Test w/o Hard Disk Scan - see below
  - Full PC Doctor Test (50 min) on page 7 - 118
  - CPU Tests on page 7 - 120
  - HD Test on page 7 - 123
  - Memory Test on page 7 - 125
  - Video Test on page 7 - 127
  - PCI Test on page 7 - 129
  - Network Test on page 7 - 131

7-6-1-3-1 Full Back End Test w/o Hard Disk Scan

NOTE: For a description of this test, refer to Full Back End Test without Hard Disk on page 7 - 15.

1.) In the *Diagnostic Test* window, trackball to **Full Back End Test w/o Hard Disk Scan** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-80 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

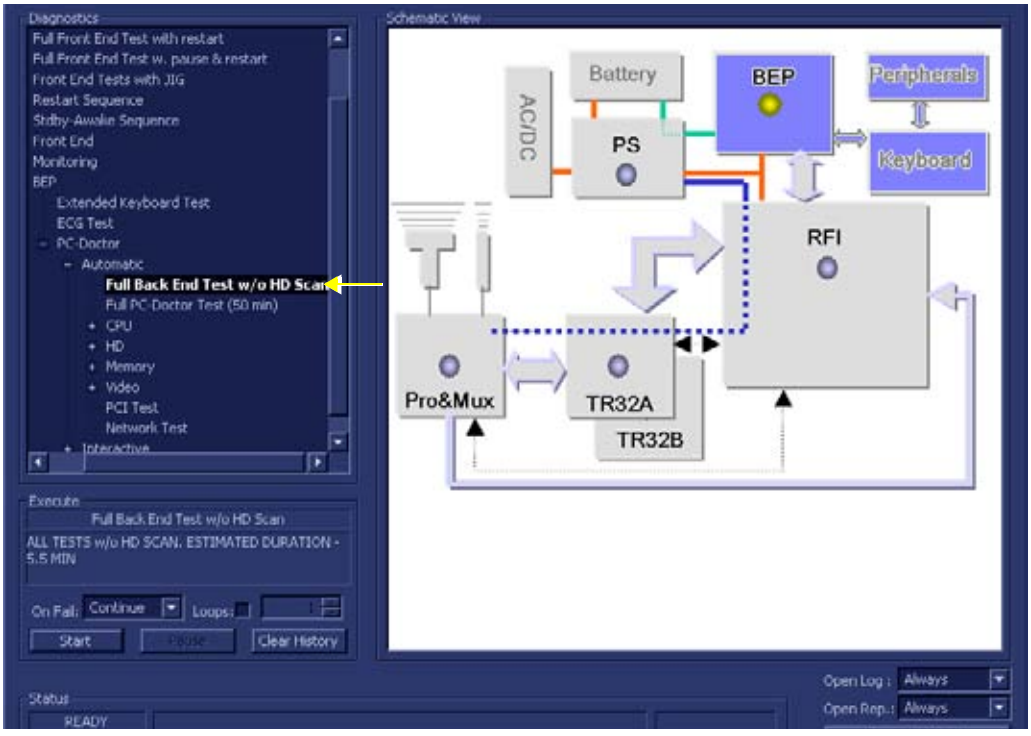


Figure 7-80 Full Back End Test w/o Hard Disk Scan

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full Back End Test w/o Hard Disk Scan commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full Back End Test w/o Hard Disk Scan sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-81.

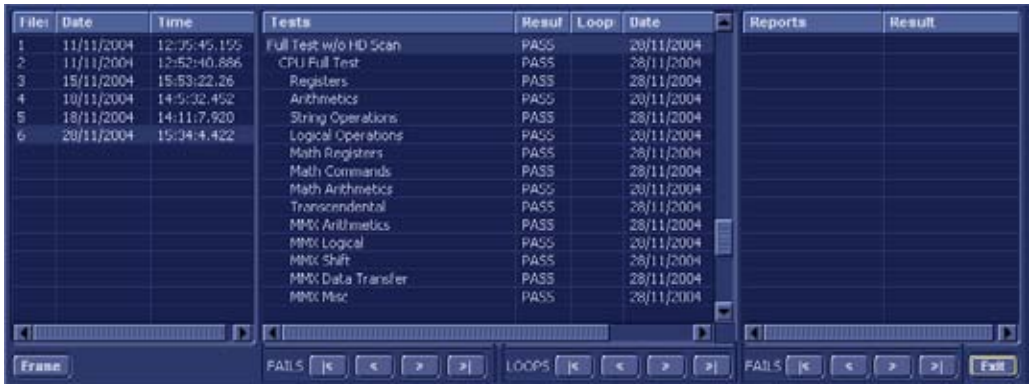


Figure 7-81 View Test Log - Full Back End Test w/o Hard Disk Scan

Note: For the Full Back End Test w/o Hard Disk Scan, many tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-81. For each currently-selected test (for example, *CPU Full Test*) the corresponding report is listed in *Reports* on the right.
For details of each report, refer to the explanations provided in CPU Tests on page 7 - 120:

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-2 Full PC Doctor Test (50 min)

NOTE: For a description of this test, refer to the information in Full PC Doctor Test (50 min) on page 7 - 15.

1.) In the *Diagnostic Test* window, trackball to **Full PC Doctor Test** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-82 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

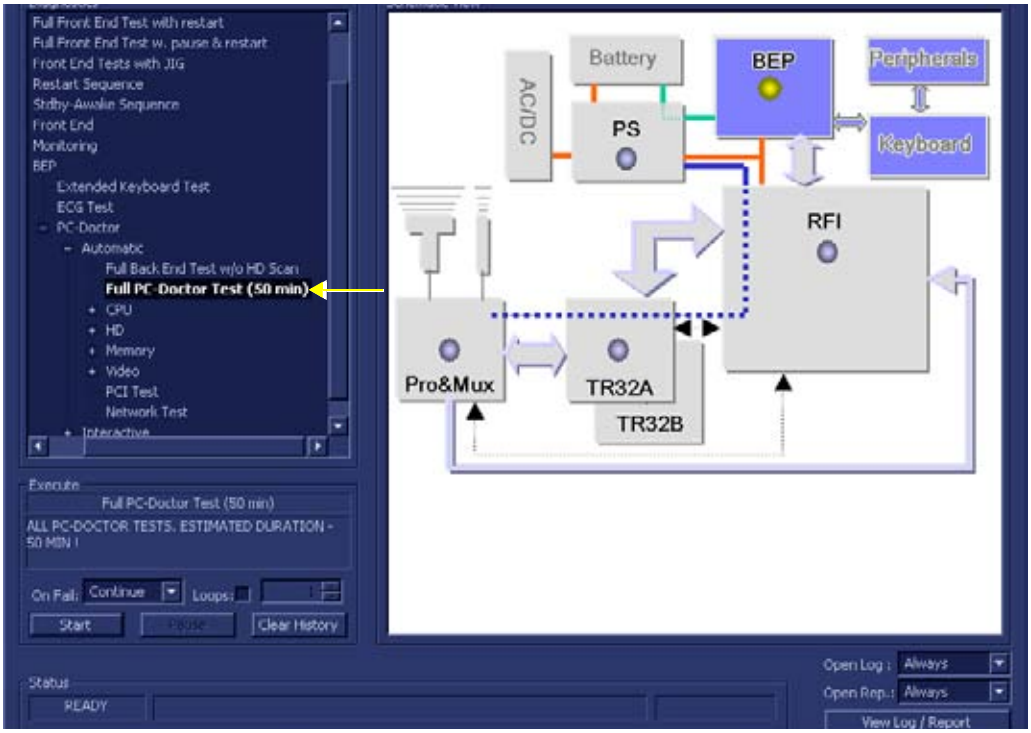


Figure 7-82 Full PC Doctor Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full PC Doctor Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full PC Doctor Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-81.

Figure 7-83 View Test Log - Full PC Doctor Test

Note: For the Full PC Doctor Test, many tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-83. For each currently-selected test (for example, *CPU Full Test*) the corresponding report is listed in *Reports* on the right.
For details of each report, refer to the explanations provided in CPU Tests on page 7 - 120:

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-3 CPU Tests

NOTE: For a description of these tests, refer to the information in CPU Tests on page 7 - 15.

1.) In the *Diagnostic Test* window, trackball to **CPU Full Test** in the list of *CPU* tests available for selection from the Diagnostic Test Tree (see Figure 7-84 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

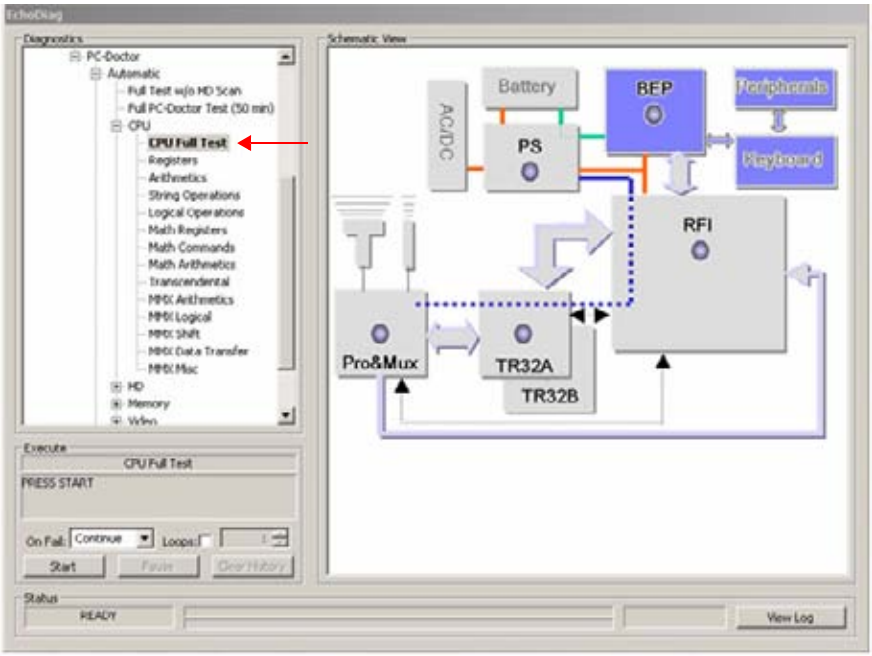


Figure 7-84 CPU Full Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The CPU Full Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the CPU Full Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-81.

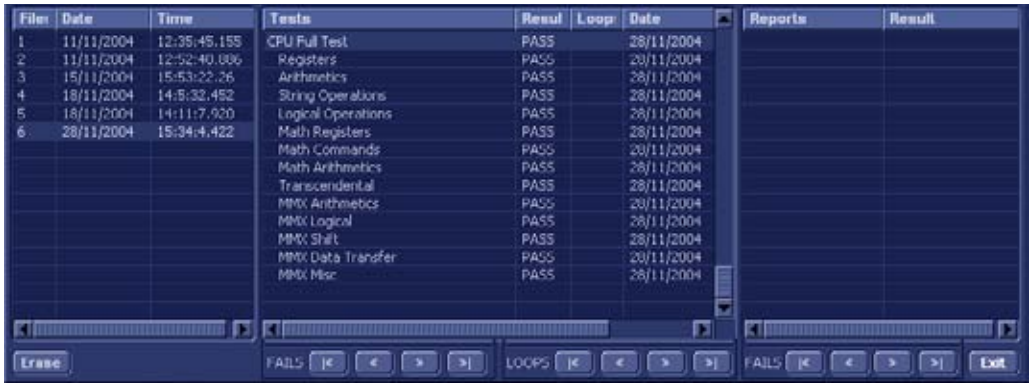


Figure 7-85 View Test Log - CPU Full Test

Note: For the CPU Full Test, many tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-83. For each currently-selected test (for example, *Registers*) the corresponding report is listed in *Reports* on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- CPU Registers
- CPU Arithmetics
- CPU String Operations
- CPU Logical Operations
- CPU Math Registers
- CPU Math Commands

- CPU Transcendental
- CPU MMX Arithmetic
- CPU MMX Logical
- CPU MMX Shift
- CPU MMX Data Transfer
- CPU MMX Misc.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-4 HD Test

NOTE: For a description of these tests, refer to the information in HD Test on page 7 - 16.

1.) In the *Diagnostic Test* window, trackball to **Hard Drive Full Test w/o Scan** in the list of *HD* tests available for selection from the Diagnostic Test Tree (see Figure 7-86 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

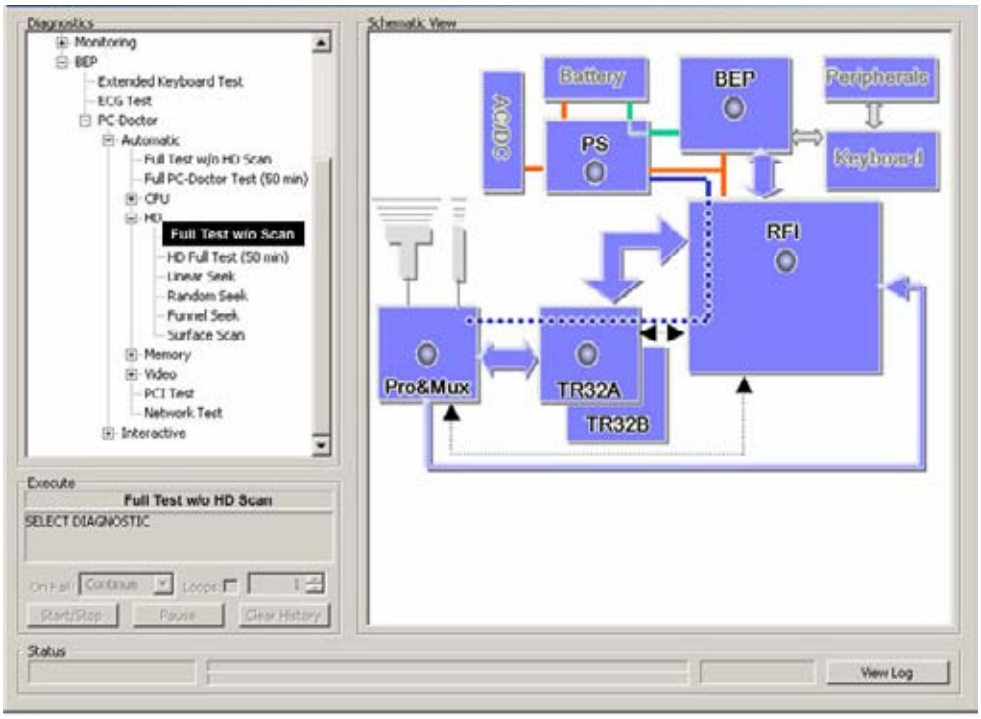


Figure 7-86 Hard Drive Full Test w/o Scan

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Hard Drive Full Test w/o Scan commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Hard Drive Full Test w/o Scan sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-87.

Figure 7-87 View Test Log - Hard Drive Full Test w/o Scan

Note: For the Hard Drive Full Test w/o Scan, several tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-87. For each currently-selected test (for example, *Linear Seek*) the corresponding report is listed in *Reports* on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- Linear Seek
- Random Seek
- Funnel Scan

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-5 Memory Test

NOTE: For a description of these tests, refer to the information in Memory Test on page 7 - 17.

1.) In the *Diagnostic Test* window, trackball to **Full Memory Test** in the list of *Memory* tests available for selection from the Diagnostic Test Tree (see Figure 7-88 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

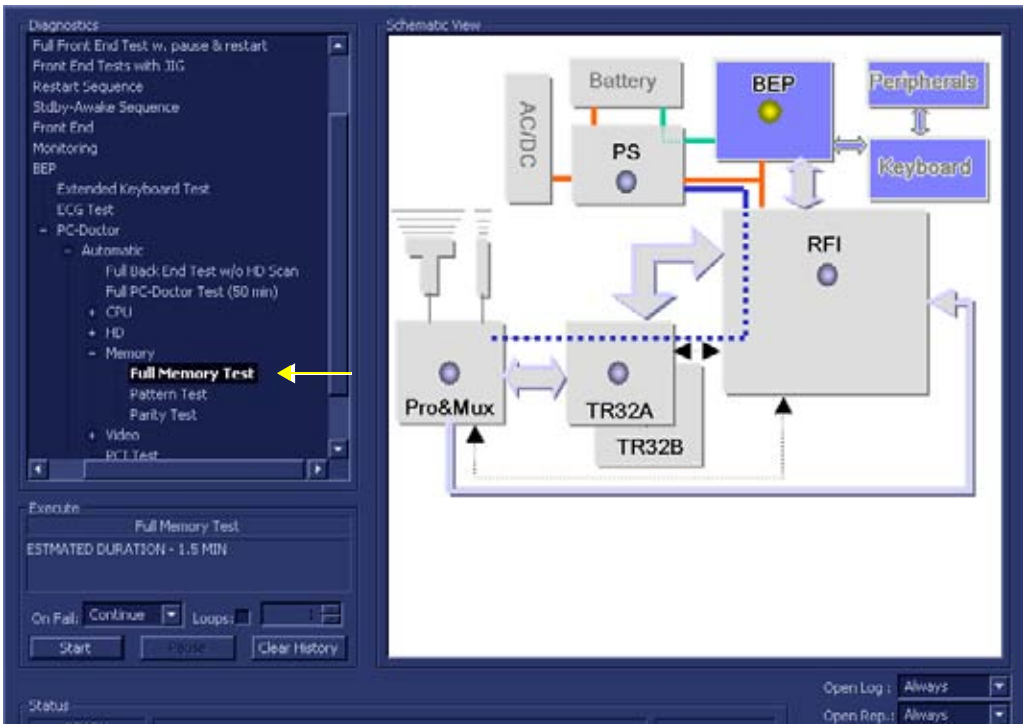


Figure 7-88 Full Memory Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full Memory Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full Memory Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-89.

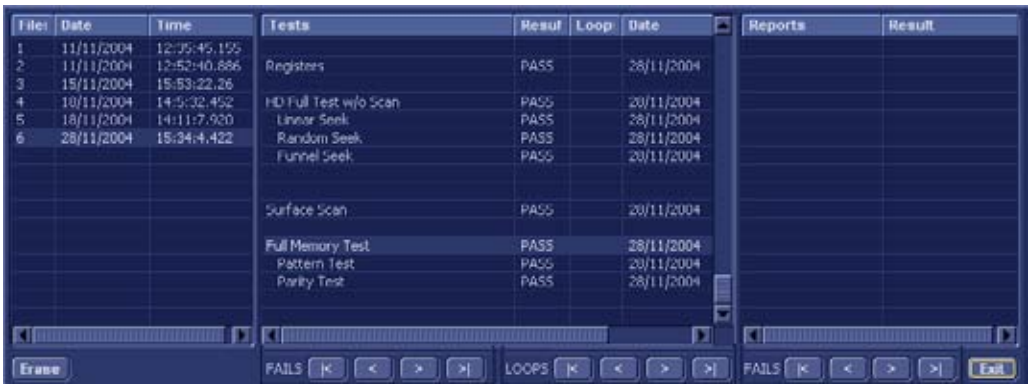


Figure 7-89 View Test Log - Full Memory Test

Note: For the Full Memory Test, several tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-89. For each currently-selected test (for example, *Memory Pattern Test*) the corresponding report is listed in *Reports* on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- Memory Pattern Test
- Memory Parity Test

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-6 Video Test

NOTE: For a description of these tests, refer to the information in Video Test on page 7 - 17.

1.) In the *Diagnostic Test* window, trackball to **Full Video Test** in the list of *Video* tests available for selection from the Diagnostic Test Tree (see Figure 7-88 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

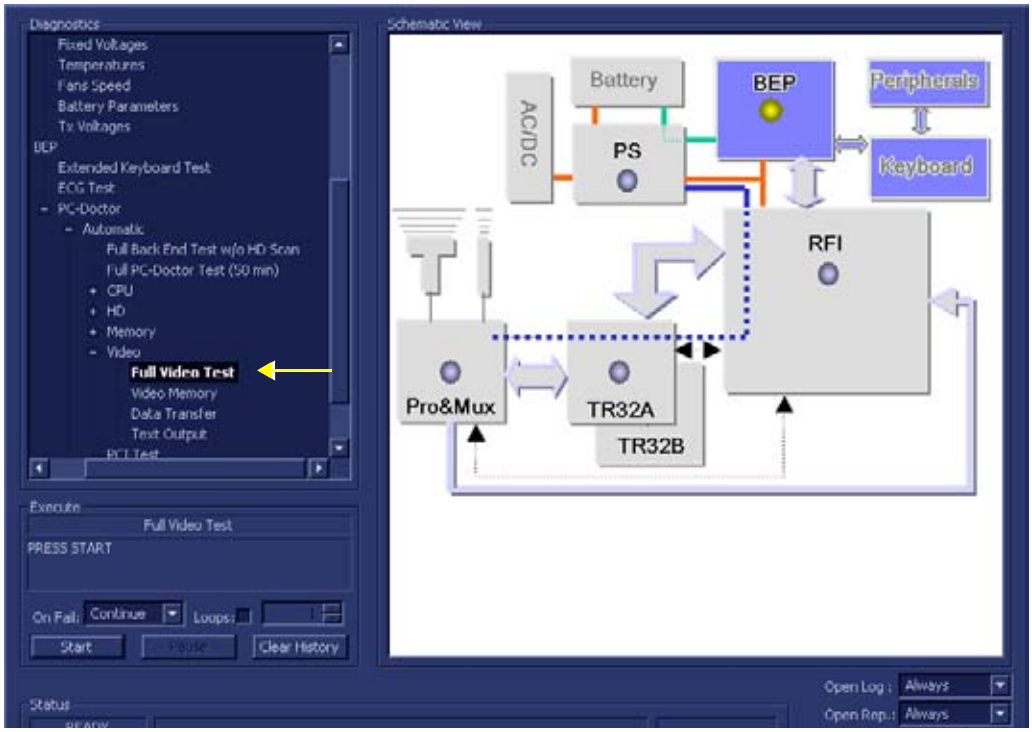


Figure 7-90 Full Video Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full Video Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full Video Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-91.

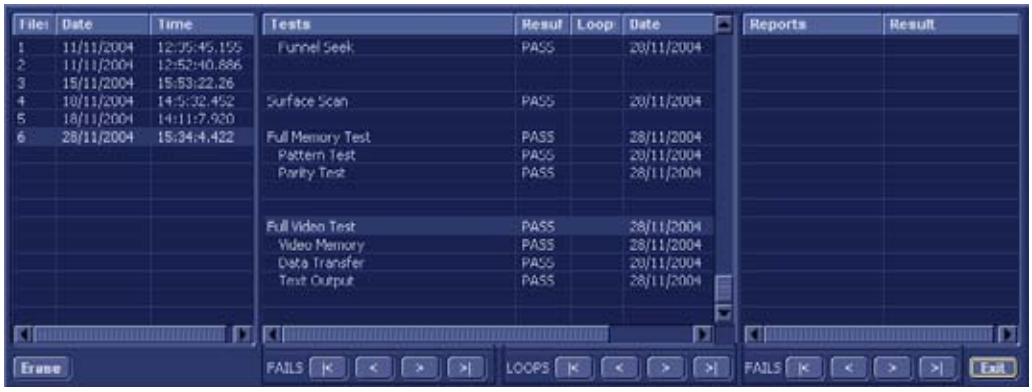


Figure 7-91 View Test Log - Full Video Test

Note: For the Full Video Test, several tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-91. For each currently-selected test (for example, *Video Memory*) the corresponding report is listed in *Reports* on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- Video Memory
- Video Data Transfer
- Video Text Output

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-7 PCI Test

NOTE: For a description of this test, refer to the information in PCI Test on page 7 - 17.

1.) In the *Diagnostic Test* window, trackball to **PCI Test** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-92 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

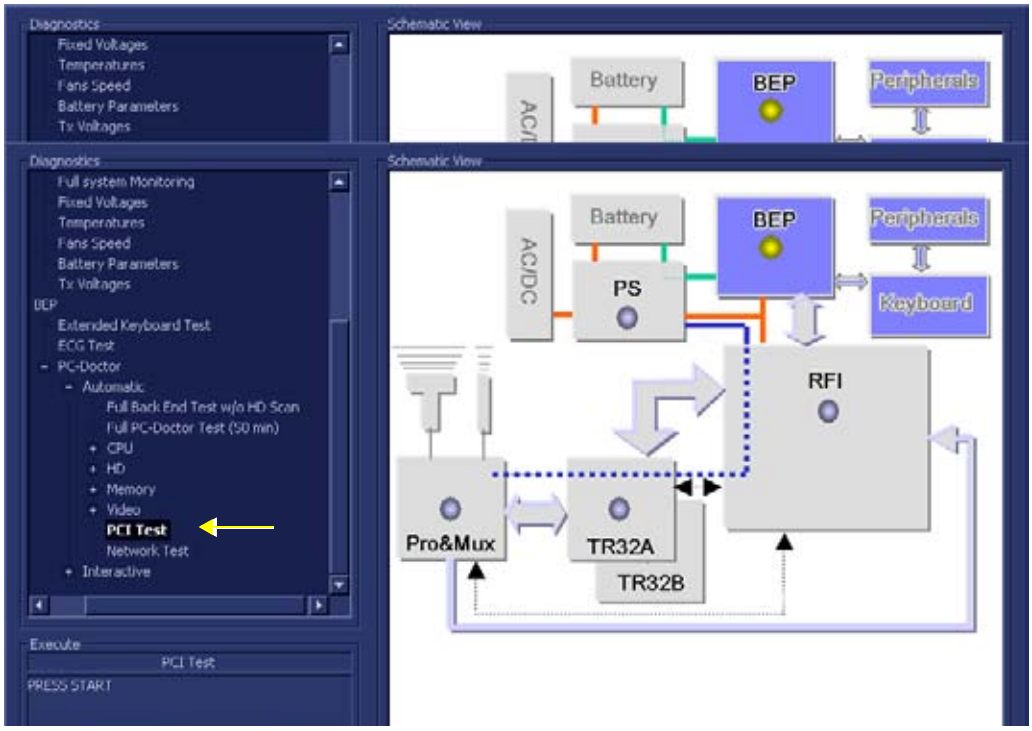


Figure 7-92 PCI Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The PCI Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the PCI Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-89.

Figure 7-93 View Test Log - PCI Test

Note: For the PCI Test, there is one report which is listed in the Tests window as shown in Figure 7-93.

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-8 Network Test

NOTE: For a description of this test, refer to the information in Network Test on page 7 - 17.

1.) In the *Diagnostic Test* window, trackball to **Network Test** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-94 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

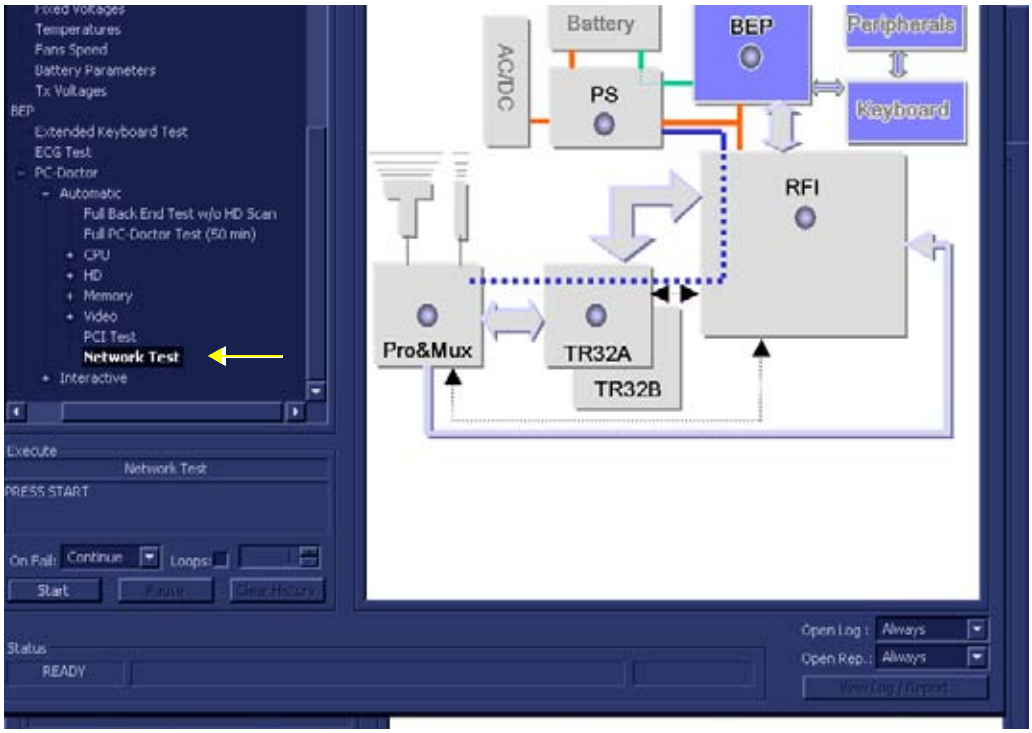


Figure 7-94 Network Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Network Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Network Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-95.

Figure 7-95 View Test Log - Network Test

Note: For the Network Test, there is one report which is listed in the Tests window as shown in Figure 7-95.

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-9 Audio Test

NOTE: For a description of this test, refer to Audio Test on page 7 - 18.

1.) In the *Diagnostic Test* window, trackball to **Audio Test** in the list of *Interactive PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-96 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

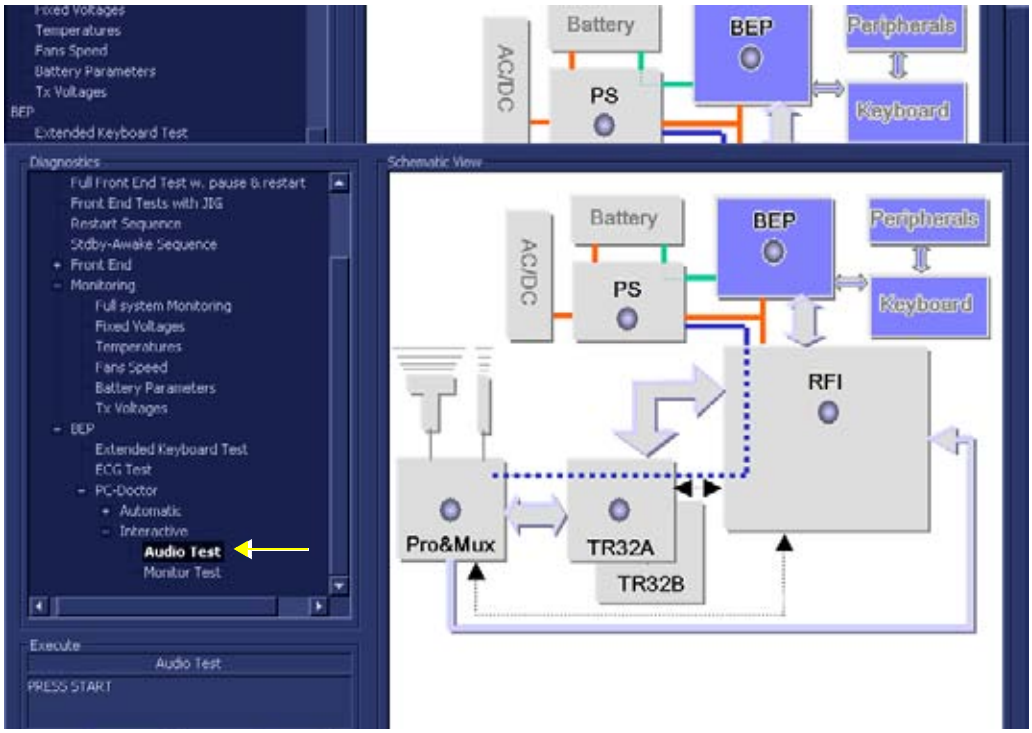


Figure 7-96 Audio Test

2.) Trackball to the **Start** button and press **Set**.

The interactive PC Dr for Windows Audio Test screen is displayed, as shown in Figure 7-97.

PC-Doctor For Windows Audio Test
Instructions
Select the speaker to play sound from. This makes sure that the speakers are set up correctly and that the sound drivers work. If you do not hear a sound when you click on one of the buttons, click on "More Info" for suggestions.
WAV
Left Channel
Both Channels
Right Channel
MIDI
Both Channels
Internal Speaker
Beep
More Info
Close

Figure 7-97 PC Doctor for Windows Audio Test

3.) Trackball to the *Left Channe*l, *Right Channel*, *Both Channels or Midi* button and press **Set** to select the speaker from which to play sound.

Note: The Internal Speaker *Beep* is disabled.

4.) Check that the sound produced from the speaker is OK and audible.

5.) Repeat step 3 to test the other channels.

Note: If no sound is heard, trackball to the **More Info** button and press **Set**. Follow the on-screen suggestions provided.

6.) When done, trackball to the **Close** button and press **Set** to exit the test.

When the Audio Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-98.

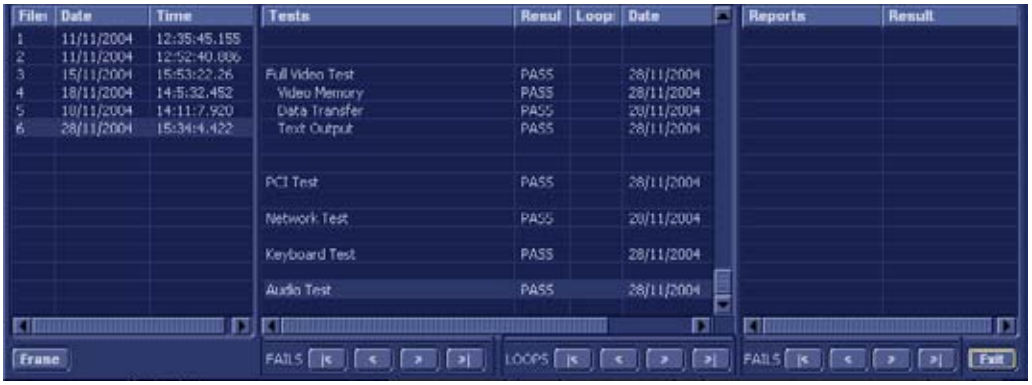


Figure 7-98 View Test Log - Audio Test

Note: For the Audio Test, there is one report which is listed in the Tests window as shown in Figure 7-98.

7) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

8.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

9.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1-3-10 Monitor Test

NOTE: For a description of the monitor tests, refer to Monitor Test on page 7 - 18.

1.) In the *Diagnostic Test* window, trackball to **Monitor Test** in the list of *Interactive PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-99 below) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

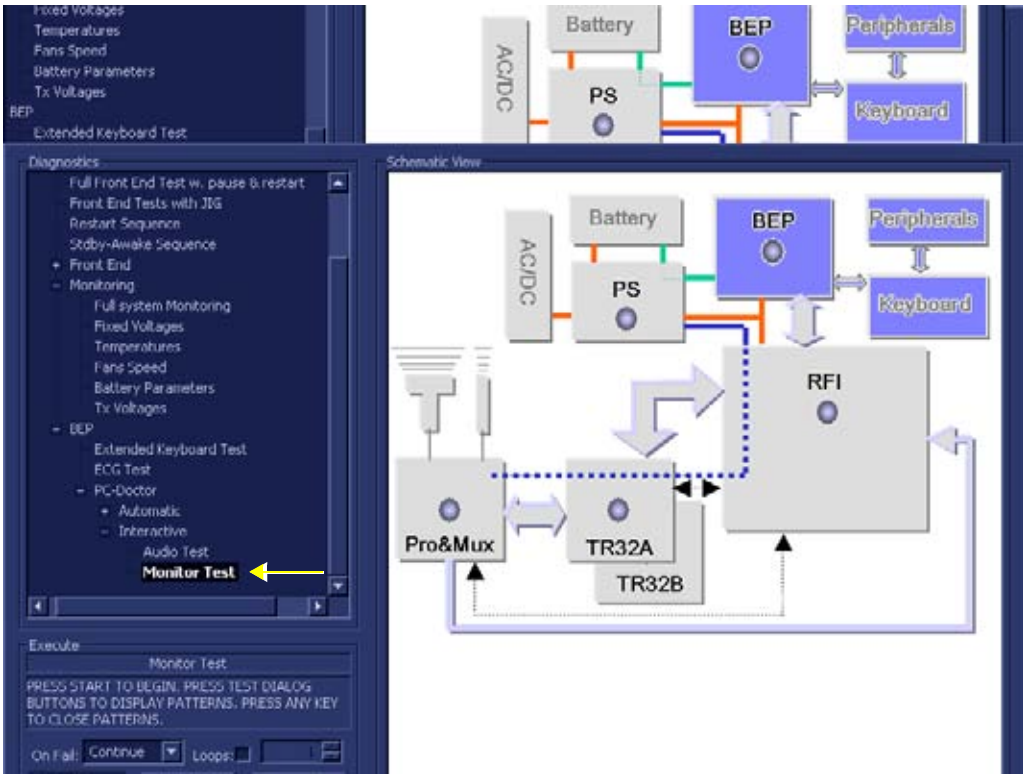


Figure 7-99 Monitor Test

2.) Trackball to the **Start** button and press **Set**.

The interactive PC Dr for Windows Monitor Test screen is displayed at the top left of the display screen, as shown in Figure 7-100.

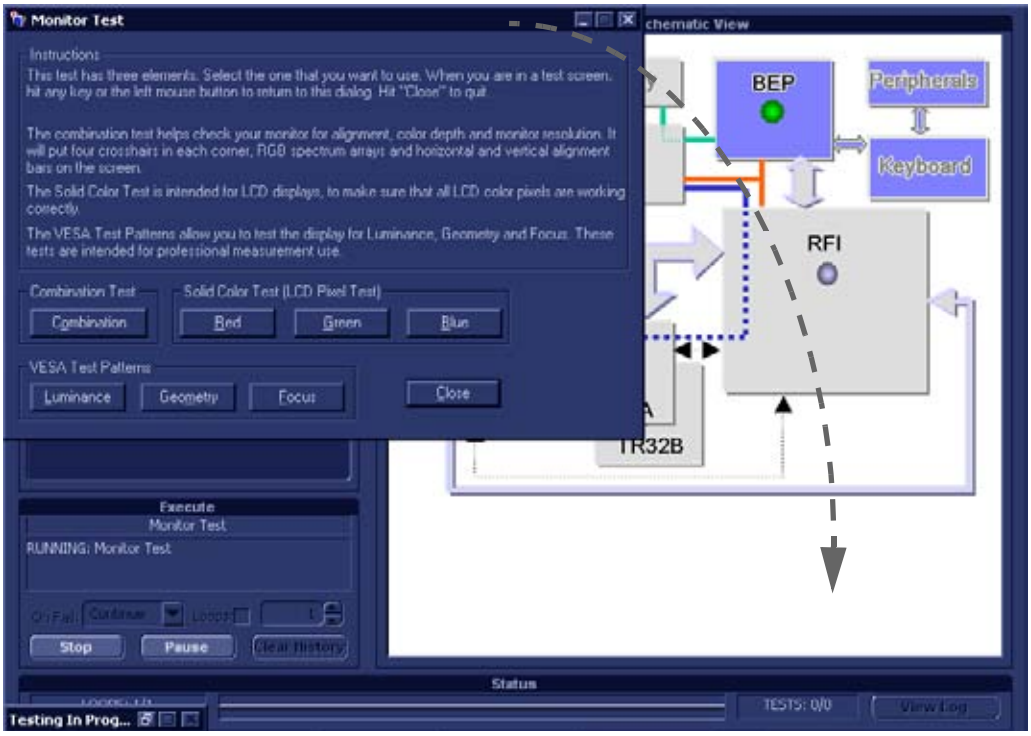

Monitor Test
Instructions
This test has three elements. Select the one that you want to use. When you are in a test screen, hit any key or the left mouse button to return to this dialog. Hit "Close" to quit.
The combination test helps check your monitor for alignment, color depth and monitor resolution. It will put four crosshairs in each corner, RGB spectrum arrays and horizontal and vertical alignment bars on the screen.
The Solid Color Test is intended for LCD displays, to make sure that all LCD color pixels are working correctly.
The VESA Test Patterns allow you to test the display for Luminance, Geometry and Focus. These tests are intended for professional measurement use.
Combination Test
Combination
Solid Color Test (LCD Pixel Test)
Red
Green
Blue
VESA Test Patterns
Luminance
Geometry
Focus
Close
Execute
Monitor Test
RUNNING: Monitor Test
Stop
Pause
Clear History
Status
Testing In Prog...
TESTS: 0/0
View Log
chematic View
BEP
Peripherals
Keyboard
RFI
TR32B

Figure 7-100 PC Doctor for Windows Monitor Test

3.) Select and drag the Test screen to another region so that the display screen is not obscured.

4.) Trackball to the required button (*Solid Color Test: Red, Green or Blue*) and press **Set** to perform the corresponding test.

5.) When in the displayed screen, press any key to return to PC Dr for Windows Monitor Test screen.

6.) When done, trackball to the **Close** button and press **Set** to exit the test.

When the Monitor Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-101.

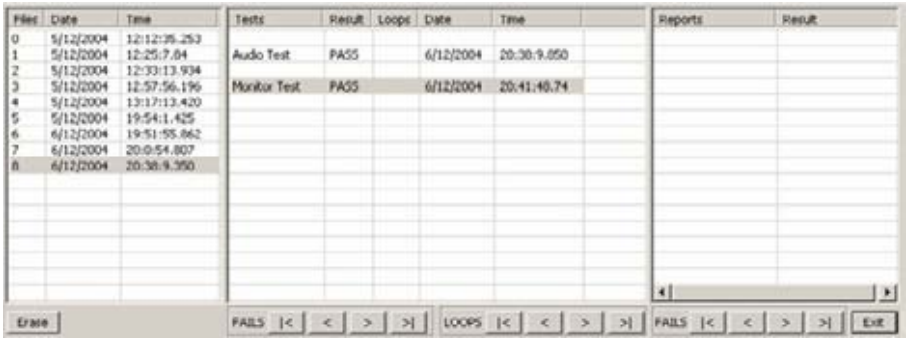


Figure 7-101 View Test Log - Monitor Test

Note: For the Monitor Test, there is one report which is listed in the Tests window as shown in Figure 7-101.

7) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If the test passed but the original problem persists, contact your local On-Line Center for assistance.
- If errors were identified (results exceeding acceptable upper or lower limits), verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory).*

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Continue trouble-shooting down to the appropriate board. (If necessary, perform a specific test).

  If the problem still persists, contact the GE HEALTHCARE On-Line Center for assistance.

8.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

9.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-7
InSite ExC

The Global Service Platform contains a set of software modules that are common to many of GE Medical Systems' ultrasound and cardiology systems. This Web-enabled technology provides links to *e-Services*, *e-Commerce* and the *iCenter* - making GE Medical Systems' scanners more e-enabled than ever.

7-7-1 Service Desktop

InSite ExC is only available in English; at this time there is no multilingual platform available.

7-7-1-1 Service Log In

1) From the Scanning Screen, click the **Global Service** icon ( ) in the status bar at the bottom of the screen.

   The Service Login dialog box is displayed, as shown below:

Figure 7-102 Service Login Dialog Box

2) From the ***Select User Level*** drop-down list, select **GE Service**.

   Then, in the ***Enter Password*** field, enter the password (as currently applicable).

Note: For a detailed description of the access and security levels, refer to the *Access and Security* section, on page 7-140.

3) Click **Okay**.

   The GEMS Service Home Page (upper section) is displayed, as shown Figure 7-103.

Figure 7-103 GEMS Service Home Page (upper section)

The lower section (next page) of the GEMS Service Home Page is illustrated in Figure 7-104.

Figure 7-104 GEMS Service Home Page (lower section)

The *GEMS Service Home Page* window contains details of the system location, the system IP address, the application status and other status information about the system. The navigation bar at the top of the page enables you to select the required diagnostic tool or application, as described in the following sections:

- *Error Logs Page* section, on page 7-140.
- *Diagnostics Page* section, on page 7-145.
- *Image Quality Page* section, on page 7-152.
- *Calibration Page* section, on page 7-152.
- *Configuration Page* section, on page 7-153.
- *Utilities Page* section, on page 7-157.
- *Replacement Page* section, on page 7-169.
- *PM Page* section, on page 7-169.

7-7-1-2 Access and Security

The service interface has various different security and user levels. Users are only granted access to the tools they are authorized to use, as described in the following table:

Table 7-1: Access and Security

User Level	Access Authorization
Operator	Normally used in-house and protected with a special scanner configuration that is not allowed to leave the facility.
Administrator	Use the OLC access method.
External Services	Access is protected with a physical media key (typically a CD-ROM) and a password. The contents of the media key determine the level of access and the period of time for which access is granted.
GE Service	Requires a network connection and knowledge of the password.

7-7-2 Error Logs Page

The Error Logs page enables the user to view the various log categories for problem analysis.

When the *Error Logs* page is selected, the Log Viewer selector is displayed in the left pane of the screen as shown in Figure 7-105 below.

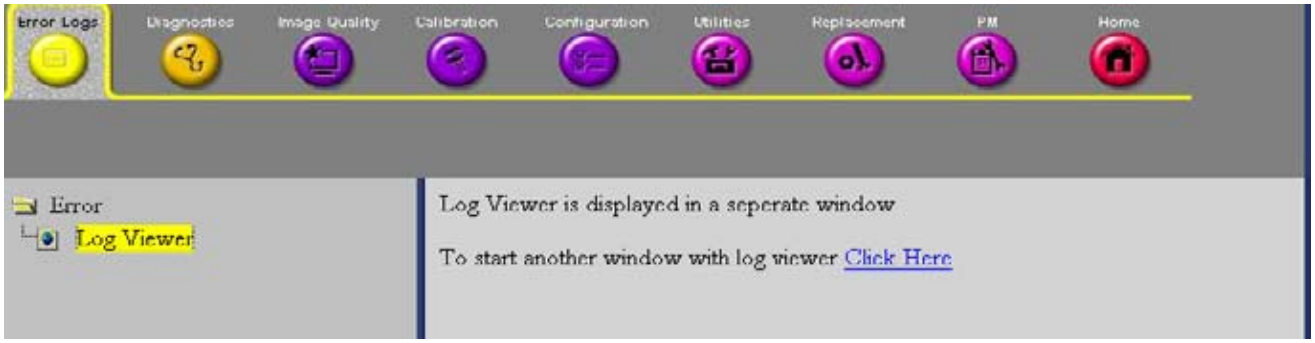


Figure 7-105 Error Logs Page

When **Log Viewer** is selected in the left pane of the *Error Logs* page, the Log Viewer - Web Page Dialog screen is displayed - Figure 7-106.

Hover the pointer over "Logs" to display the available log categories shown in Figure 7-107. Click a category to navigate to the desired log category.

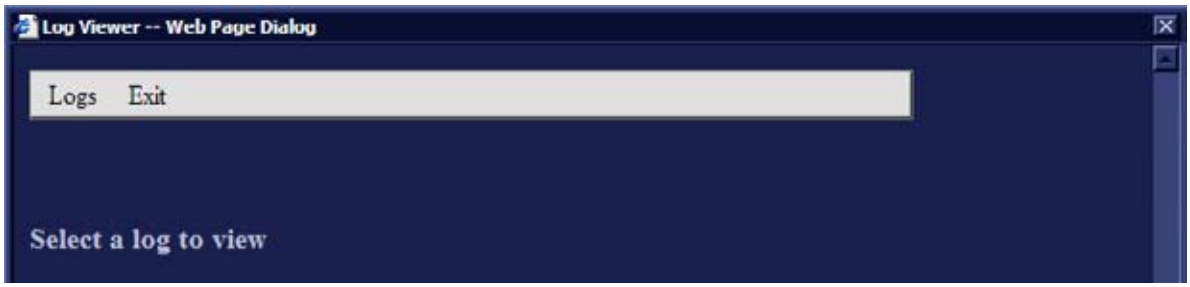


Figure 7-106 Log Viewer

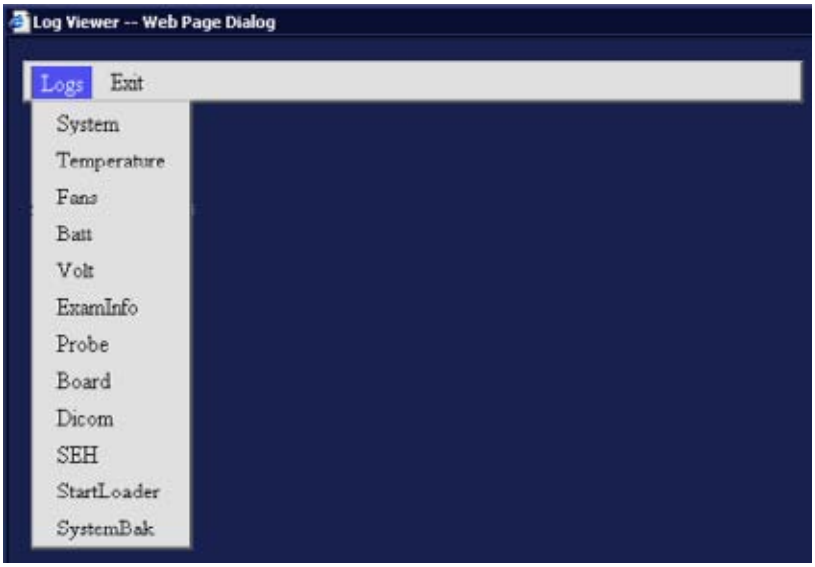


Figure 7-107 Error Logs- Available Categories

7-7-2-1 Examples and Brief Description of Selected Categories

When selecting **System** in the Logs drop-down menu, the following tabs are displayed, as shown in Figure 7-108.

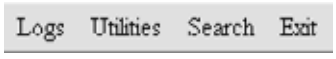


Figure 7-108 Tabs Displayed when selecting System from the Logs Menu

The following menu categories are explained in the sections below:

- System (Logs) on page 7 - 142
- Utilities on page 7 - 143
- Search on page 7 - 144
- Exit on page 7 - 144

7-7-2-1-1 System (Logs)

Displays all the system logs, including errors and additional details, see Figure 7-109.

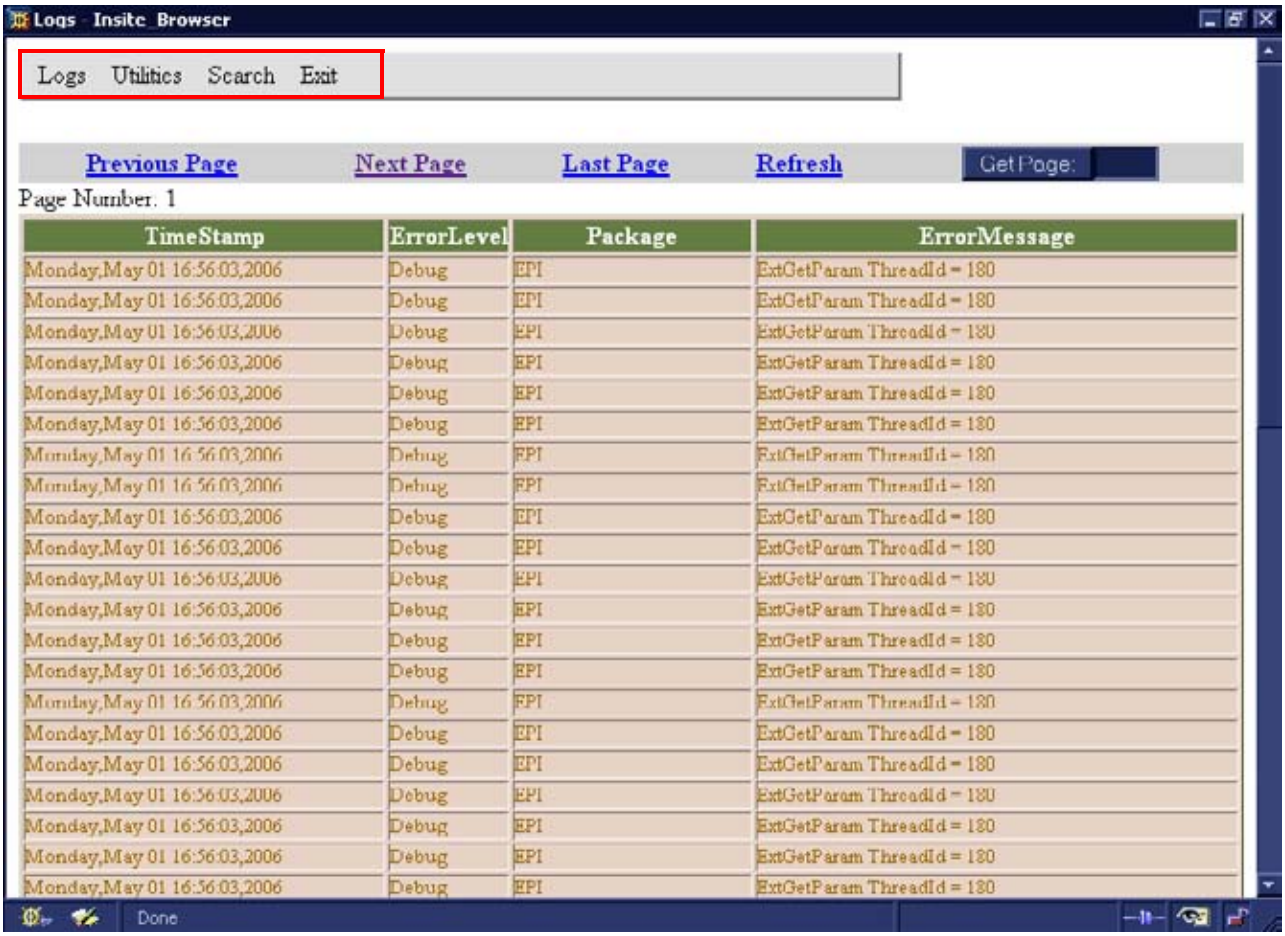


Figure 7-109 System Logs

Note: When a log category has been selected, it is possible to select additional log categories from the Log menu that appears at the top of the current screen - see the red rectangle in Figure 7-109.

7-7-2-1-2 Utilities

The **Utilities** option on the **Logs Viewer** menu enables you to access the following log utilities:

- **Plot Log:** Enables you to view the number of messages in the log in graphic form. For example, select **Power** or **Temperature** from the **Log** option on the **Logs Viewer** menu, and then select **Plot Log** to display the results as shown in Figure 7-110.

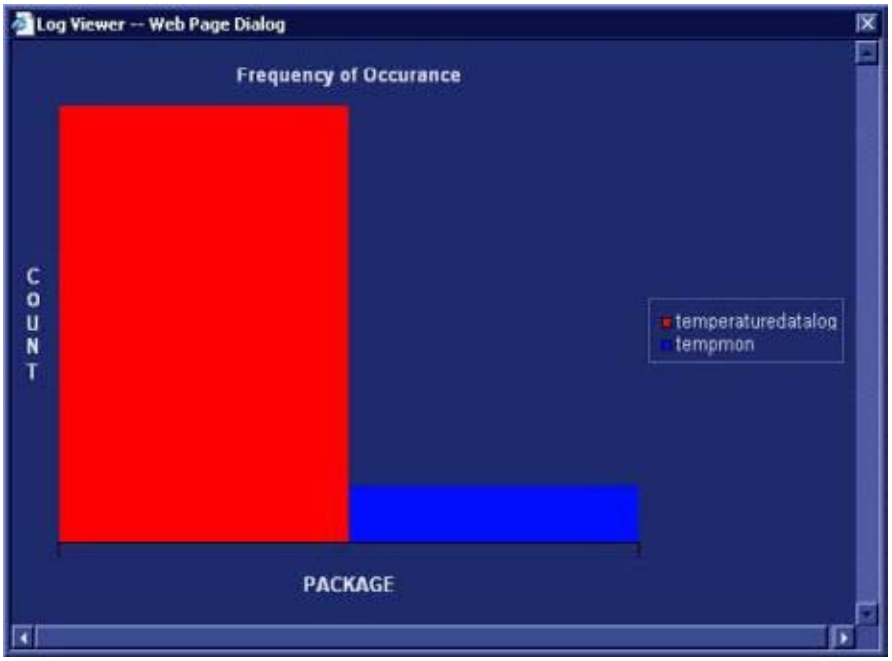


Figure 7-110 Plot Log Window

- **Plot Page:** Enables you to view the results of the System log in graphic form, showing the distribution of the log information according to packages. For example, select **System** from the **Log** option on the **Logs Viewer** menu, and then select **Plot Page** to display the results as shown below:

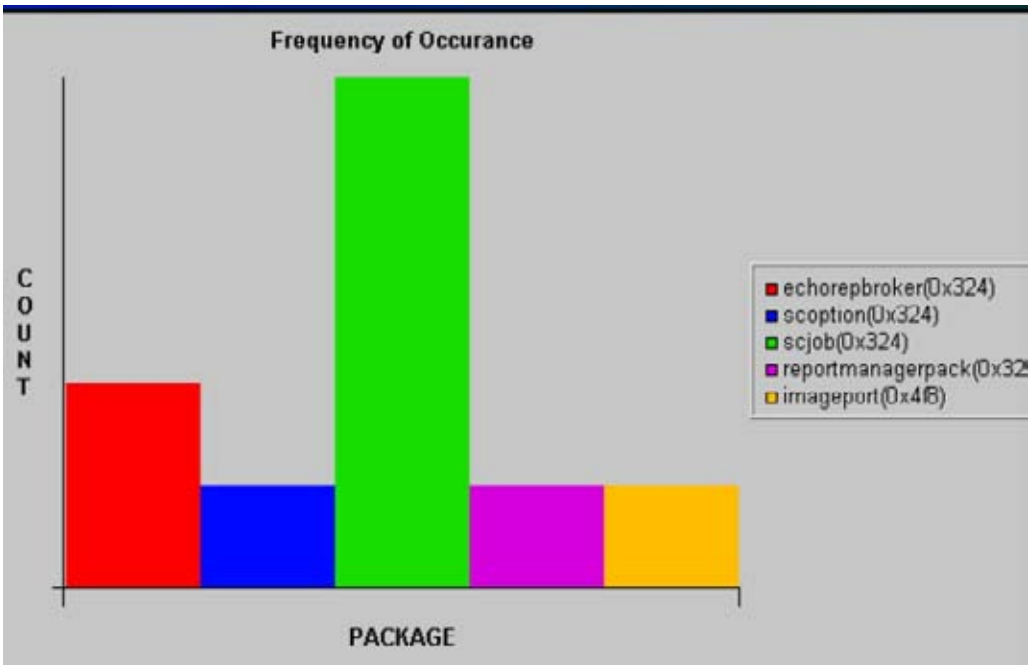


Figure 7-111 Plot Page Window

7-7-2-1-3 Search

The **Search** option on the **Logs Viewer** menu enables you to enter case-sensitive text that you want to find from the log page that you are currently viewing, as shown below:

Figure 7-112 Search for Text in Log or Page

7-7-2-1-4 Exit

The **Exit** option on the **Log Viewer** menu enables you to exit the **Log Viewer**. Select the **Exit Log Viewer** option to return to the Common Service Desktop.

Figure 7-113 Exit Option

7-7-3 Diagnostics Page

The service platform uses a Web-controlled user interface to access common service components and perform diagnostics. There are two types of diagnostics:

- **Interactive:** The user is required to perform an operation on the ultrasound unit in order for the test to be completed successfully. This option is not applicable when used remotely.
- **Non-Interactive:** The tests are performed without the user's intervention.

7-7-3-1 Diagnostics Page Overview

The left pane of the Diagnostics page is shown in Figure 7-114 below.

There are five main categories:

- Calibration
- Full System Test
- Front End
- Monitoring
- BEP

You can expand each category to drill down to the various diagnostic tests by clicking on the plus sign adjacent each category. For an example, see Figure 7-115.

Figure 7-114 Diagnostics Page - Left Pane

When a diagnostic is selected in the left pane of the *Diagnostics* page, the corresponding tests in the right pane can be performed (refer to the procedure instructions). For example, under Calibration, the DC Offset Calibration diagnostic test can be performed (see Figure 7-115 on page 7-146).

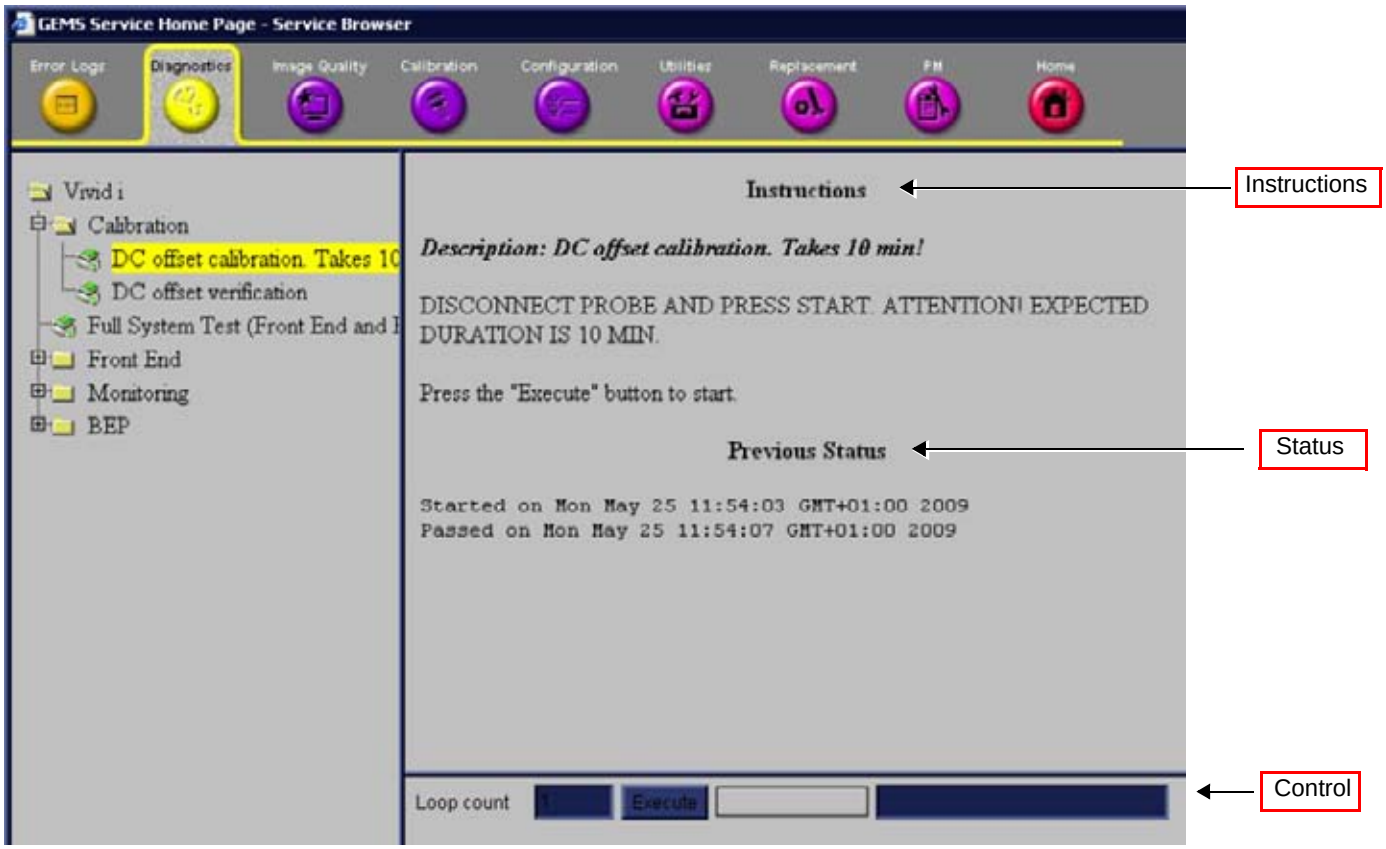


Figure 7-115 Diagnostics Page Overview showing DC Offset Calibration Diagnostic in Right Pane

As shown in Figure 7-115, the right pane is divided into three parts, explained below:

- **Instructions**

  The Instructions refer to a test-specific HTML page, or the default instructions HTML page.

- **Status**

  The "Status" section is the last-known status for the particular diagnostic. When a new diagnostic test is performed, the section displays the latest status of all test results.

- **Control**

  Control enables you to control the diagnostics and provide feedback. The background color of the Control frame is initially grey. Upon completion of a diagnostic, the background color changes to indicate the updated status - either *Red* (**Fail**), *Green* (**Pass**) or *Grey* (**Abort**).

  - **Loop Count Field**: Enables you to enter the number of times that the diagnostic test should be performed. Any numeric value between one and four digits can be entered. This field is queried after you press Execute to start a diagnostic test.
  - **Execute Button:** Enables you to start a selected diagnostic test. Once the diagnostic is running, the Execute button becomes the Abort button, enabling you to stop the diagnostic.
  - **Text Field:** Displays a short starting or aborting message, as well the diagnostic completion status.
  - **Progress Indicator:** Displays the test progress.

7-7-3-2 Vivid-i™/ Vivid-q™ Diagnostics

7-7-3-2-1 Calibration

The diagnostic tests accessed under *Calibration* are described in the following sections:

- DC Offset Calibration on page 7 - 25
- DC Offset Verification on page 7 - 28

7-7-3-2-2 Front End

The Front End directory tree showing all the Front End diagnostic tests is shown in Figure 7-116.

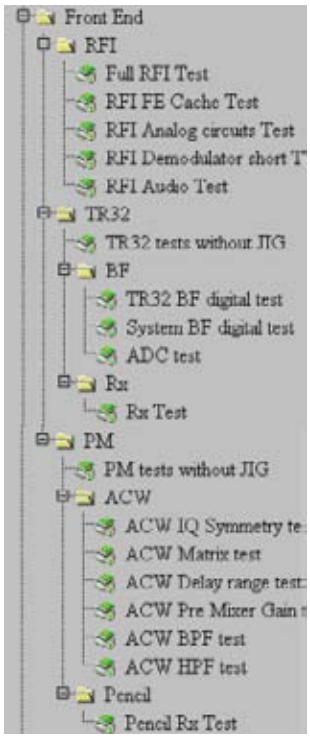


Figure 7-116 Front End Diagnostics Directory

The Front End diagnostic tests are described in the following sections:

- RFI
  - RFI FE Cache Test on page 7 - 34
  - RFI Analog Circuits Test on page 7 - 37
  - RFI Demodulator Short Test on page 7 - 40
  - RFI Audio Test on page 7 - 43
- TR32
  - TR32 tests without jig - see TR32 Tests on page 7 - 12

- BF
  - TR32 BF Digital Test on page 7 - 46
  - System BF Digital Test on page 7 - 49
  - ADC Test on page 7 - 52
- RX
  - RX Test on page 7 - 57
- PM
  - PM tests without JIG - see PM Tests on page 7 - 12.
- ACW
  - ACW IQ Symmetry Test on page 7 - 12
  - ACW Matrix Test on page 7 - 13
  - ACW Delay Range Test on page 7 - 13
  - ACW Pre-Mixer Gain Test on page 7 - 13
  - ACW BPF Test on page 7 - 13
  - ACW HPF Test on page 7 - 13
- Pencil
  - Pencil Rx Test on page 7 - 13

7-7-3-2-3 Monitoring

The diagnostic tests accessed under *Monitoring* are described in the following sections:

- Full System Monitoring Test on page 7 - 87
- Fixed Voltages Test on page 7 - 94
- Temperatures Test on page 7 - 97
- Fans Speed Test on page 7 - 100
- Battery Parameters Test on page 7 - 103
- Tx Voltages Test on page 7 - 106

7-7-3-2-4 BEP

The BEP directory tree showing the BEP diagnostic tests is shown in Figure 7-117.

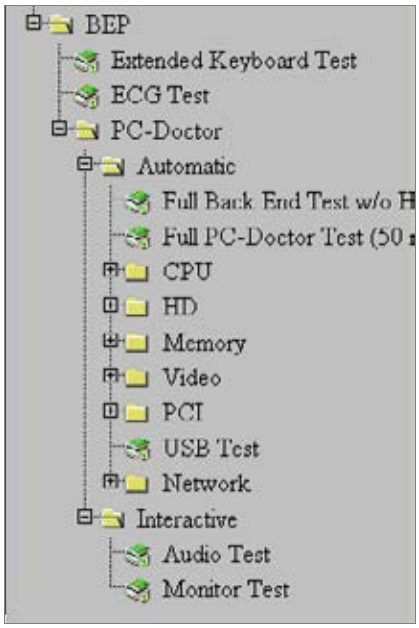


Figure 7-117 BEP Diagnostics Directory

The BEP diagnostic tests are described in the following sections:

- Extended Keyboard Test on page 7 - 14
- ECG Test on page 7 - 14
- **PC-Doctor - Automatic**
  - Full Back End Test w/o Hard Disk Scan on page 7 - 116
  - Full PC Doctor Test (50 min) on page 7 - 118
  - CPU Tests on page 7 - 120
    - Registers
    - Level 2 Cache
    - Math Register
    - MMX
    - SSE
    - SSE2

- **HD**

  Hard Drive Test (All): Performs a battery of tests to examine the hard drive and ensure that it can perform all its functions. All the remaining tests are performed on the hard drive to ensure that the hard disk controller and the drive mechanism are working correctly. The disk surface itself is also checked. This test may take over ten minutes - see *HD Test* section, page 7-123.

  - HD Full Test without Scan
  - HD Full Test (50 minutes duration)
  - Linear Seek - moves the hard disk drive heads from track 0 to the maximum track one track at a time
  - Random Seek
  - Funnel Seek - moves the hard disk drive heads in a funnel fashion (from the first track to the last, then to the second track, the second last track, the third track and so on
  - Surface Scan - scans the surface for defects on the hard disk drive

- **Memory**

  Memory Test (All): Uses 18 test patterns to test memory locations. If errors are detected, the address of the block in which the error was detected is shown. During testing, these diagnostics will also look for parity errors and other exceptions. If encountered, these are added to the test log as errors - see *Memory Test* section, page 7-125.

  - Full Memory Test
  - Pattern Test - Uses several test patterns to test as much memory as possible
  - Advanced Pattern Test

- **Video**

  Video Test (All): Test the system's video capabilities. This involves testing the memory, testing the graphics acceleration and testing the text output. You can follow the tests being performed on the monitor. This test can be cancelled at any time by pressing <**Esc**> on the keyboard - see *Video Test* section, page 7-127.

  - Video Memory - tests the video memory by filling the video buffer with 18 test patterns, one pattern at a time. These tests fill the entire screen with a single color

- **PCI**

  PCI diagnostic tests ensure that the PCI bus is working up to speed. The motherboard is scanned to verify the configuration space and to ensure that the diagnostics can communicate with the board - see *PCI Test* section, page 7-129

  - Full PCI Test
  - PCC and Socket Status Test
  - PCI Configuration Test

- **USB Test**

  The USB Test checks the USB connections.

- **Network**

  The PC Doctor Network Test will reveal that a network card is present without a driver installed. These cards are not likely to show up on a PC's list of network cards available for test. This may cause the test to return a result of "not applicable", meaning no network cards were found. The test may detect other issues such as electrical interference (noise), circuitry damage, loose connectors, and crimped or bad network cables.

  The Network Test will test DSL or cable internet connections, which operate within a network environment. However, this test does not test the DSL or cable modem used for accessing the Internet. Currently, no PC-Doctor test exists for testing cable or DSL modems.

  The Network Communications Test checks if your PC's network card works and if your PC properly communicates over a network. It makes a list of all the remote PCs on the network that the NIC uses and sends information in the form of several "data packets" from the tested PC to the "host" PCs. These "data packets" are then returned by the "host" PCs to the tested PC where the contents of the "data packet" are checked. If too many of the "data packets" fail to get returned or are thrown away because of data corruption, the Network test logs as FAILED.

  - Full Network Test - see full *Network Test* section, page 7-131.
  - Network Cable Test
  - Network Link Test
  - TC/IP Internal Loopback Test
  - TC/IP Network Communication Test

- **PC-Doctor - Interactive**

  - **Audio Test**

    This is performed to check for proper operation of the audio system; the following selections are available: *Left Channel*, *Right Channel*, *Both Channels,* and *MIDI* - see *Audio Test* section, page 7-133.

  - **Monitor Test**

    See *Monitor Test* section, page 7-135.

7-7-4 Image Quality Page

When the *Image Quality* page is selected, as shown below, you can verify and calibrate image quality.

Figure 7-118 Image Quality Page

7-7-5 Calibration Page

Figure 7-119 Calibration Page

Note: This page is not populated in this version.

When the *Calibration* page is selected (as shown in Figure 7-119), although not populated, you can perform different calibration procedures, as described in *Chapter 6 - Service Adjustments*.

For additional calibration procedures, refer to the following sections:

- DC Offset Calibration - see DC Offset Calibration on page 7 - 25.
- DC Offset Verification - see DC Offset Verification on page 7 - 28.

7-7-6 Configuration Page

7-7-6-1 Software Options Interface

When the *Configuration* page is selected, you can access the **Software Options Interface** and install software options for the specific Vivid-i™/ Vivid-q™ system.

No changes should be made in this page without the help of GE Medical Systems Service Personnel, as any modifications made by untrained personnel can cause damage to the ultrasound unit.

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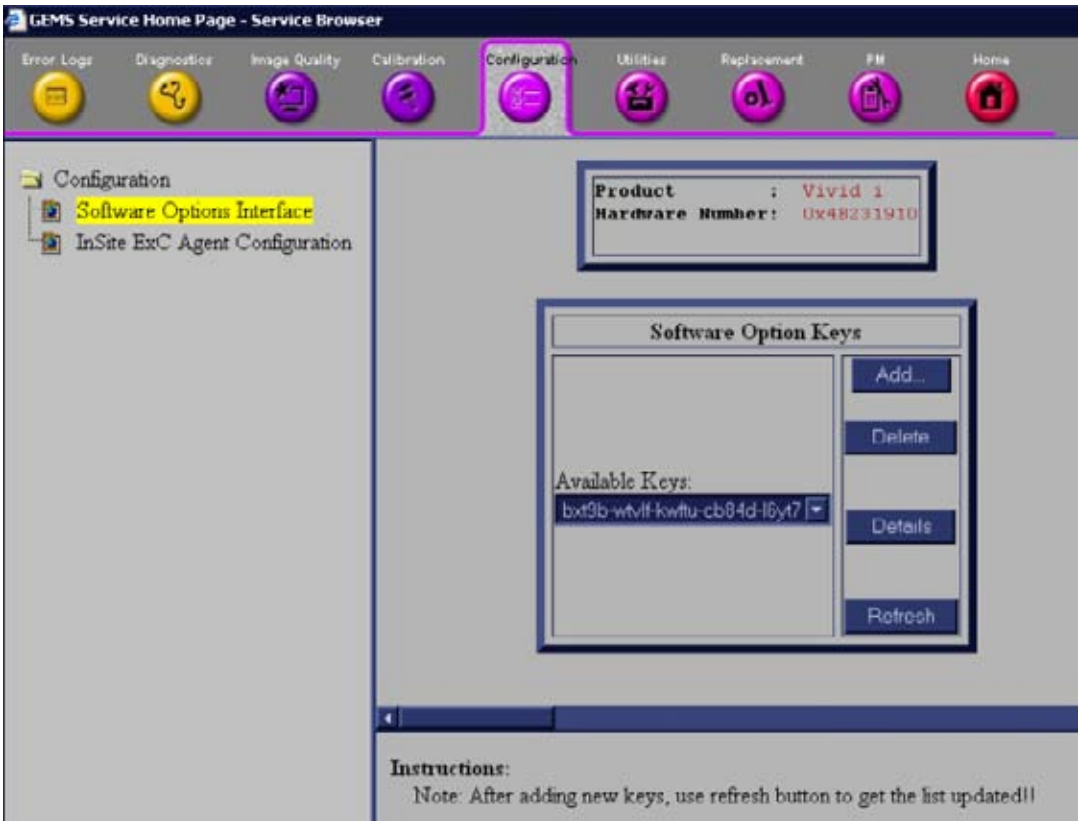

Figure 7-120 Configuration Page

7-7-6-2 InSite ExC Agent Configuration

When InSite ExC Agent Configuration is selected, you access the Agent Configuration screen shown in Figure 7-121.

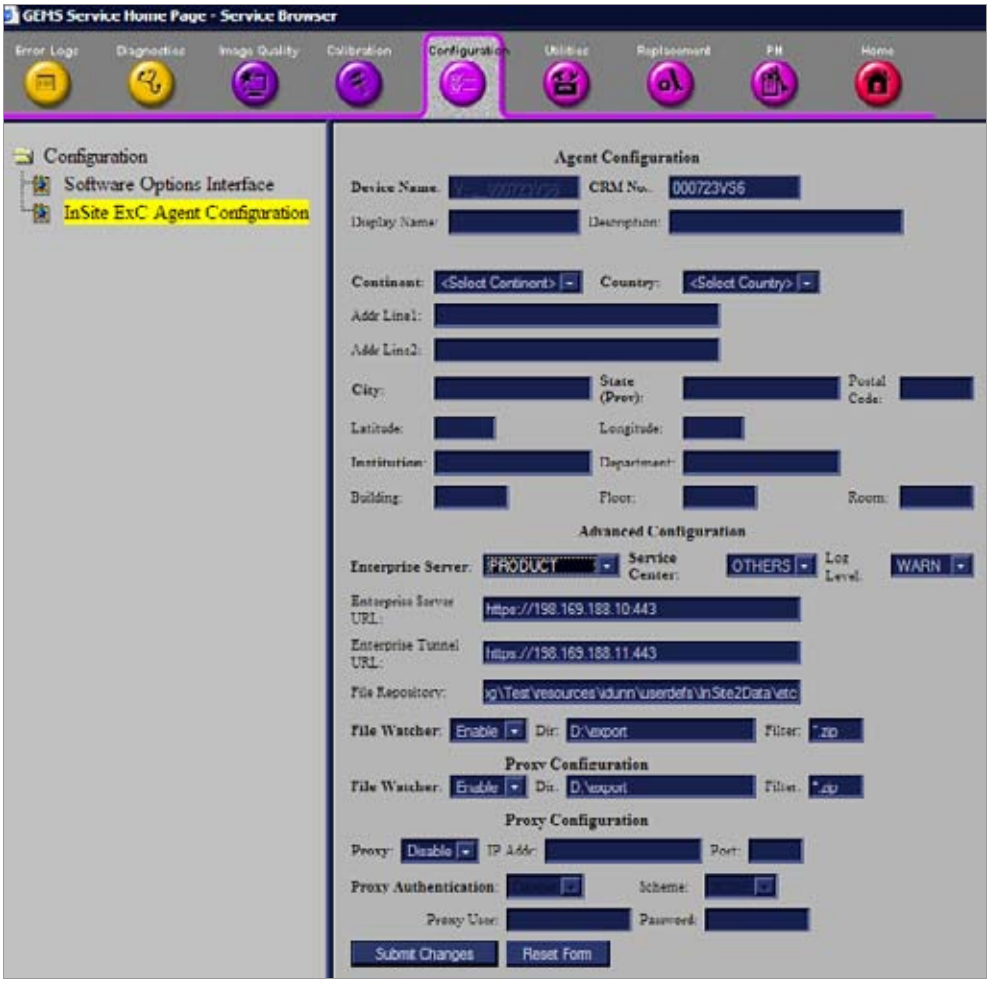

Figure 7-121 Agent Configuration Screen

*NOTE: In Figure 7-121, field headings appearing in **bold face** (such as, "Enterprise Server") are mandatory; data must be filled in by the user.*

7-7-6-2-1 Description of Agent Configuration Tool Fields

NOTE: The Device Name field is pre-populated. This is a required field.

Field	Description
Device Name	This field is pre-populated and is a required field
CRM No.	Must match system ID as it appears in the CRM system
Continent	Select continent
Country	Select country
Enterprise Server	Select "Product"
Service Center	Select "Others"
Log Level	Select "Warn"
Enterprise Server URL	https//:198.169.188.10:443
Enterprise Tunnel URL	https//:198.169.188.11:443
File Repository	Pre-populated field as follows: D:\Marlin\Test\resources\idunn\userdefs\InSite\etc Do not change this field.
File Watcher	Select "Enable"
Filter	Type *.*
Proxy	Must be set to "Disable" unless provided by the hospital

1.) In the *CRM* field, enter the System ID.

Note: **This is a required field**. For consoles located in the U.S.A., the System ID is pre-populated. Outside the U.S.A., follow the local System ID convention.

2.) In the *Display Name* field, enter a descriptive name that is easy to identify with this device. For example "Unit 1".

3.) In the *Description* field, create a unique description of the system. This is a required field. For example, “St. Mary’s Hospital”.

4.) Select **Continent** and **Country** on drop-down menus.

5.) In the *Address* fields, enter the address where the system resides. Be sure to enter the zip code of the address, or the longitude and latitude position.

6.) In the *Enterprise Server* field select **PRODUCT**, select **OTHERS** and **WARN**.

7.) Do not change the Log Level field selection unless you receive an OLC request.

8.) In the *Enterprise Server URL* field, enter: https//:198.169.188.10:443

9.) In the *Enterprise Tunnel URL* field, enter: https//:198.169.188.11:443

10.) Do not change the File Repository path.
This path is set by Engineering as: D:\Marlin\Test\resources\idunn\userdefs\InSite\etc.
InSite ExC files in this directory are sent to the GE repository where the OLC can choose to review them periodically.

11.) The File Watcher selection is set by Engineering and should always be enabled.

12.) In the *Filter* field, enter “*.*”.

NOTE: File Watcher automatically sends to the GE repository any new or modified files that reside in the specified directory AND match the filter criteria.

13.) If the customer’s installation does not require a proxy server then set the proxy field to Disable and proceed to step 15.

14.) If the customer's installation requires a proxy server then set the proxy field to Enable, enter the IP address and Port and proceed as follows:

- If the customer's installation does not require Proxy Authentication, set the Proxy Authentication field to Disable and proceed to step 15.
- If the customer's installation requires Proxy Authentication, set the Proxy Authentication field to Enable, enter the Proxy User and Password fields, and confirm the scheme field.

15.) Select **Submit Changes** shown in Figure 7-121.

16.) If you are requested to confirm a password, click **Yes**. The Submit Changes screen opens.

17.) Reboot the system to verify the configuration setup.

18.) Click **Home** to return to the Home page and confirm that Service Connectivity is configured correctly.

If configured properly, the Service Home Page updates in approximately 10 seconds (although it might take up to 2 minutes).

Note: If it does not update, check that the Agent Configuration Tool screen has the correct URL / IP address information. Make corrections, and repeat step 15. If it fails again, access the Central Support site for troubleshooting information.

19.) Confirm that the system is registered in the Questra Web Enterprise using one of the following methods:

a.) If you have access to remote connectivity, use your account.

b.) Call for InSite checkout.

c.) Call OLC or RSS. (OLC has training available in myLearning.)

7-7-7 Utilities Page

When the **Utilities** tool is selected in the left pane of the *Utilities screen*, the following operations can be performed:

7-7-7-1 Common Utilities

- **Event Log Viewer** - see Figure 7-122.

Figure 7-122 Event Log Viewer

- **Disruptive Mode** - when the OLC or field engineer requests the user to invoke the Disruptive mode, the user will be asked to confirm Disruptive Mode by clicking the Yes button, as shown in Figure 7-123. Disruptive mode enables the OLC or field engineer to take control of the system for problem-solving purposes.

NOTE:If you need to enter Local System Diagnostics while the system is in Disruptive mode, you must first restart the system — and then proceed with troubleshooting.

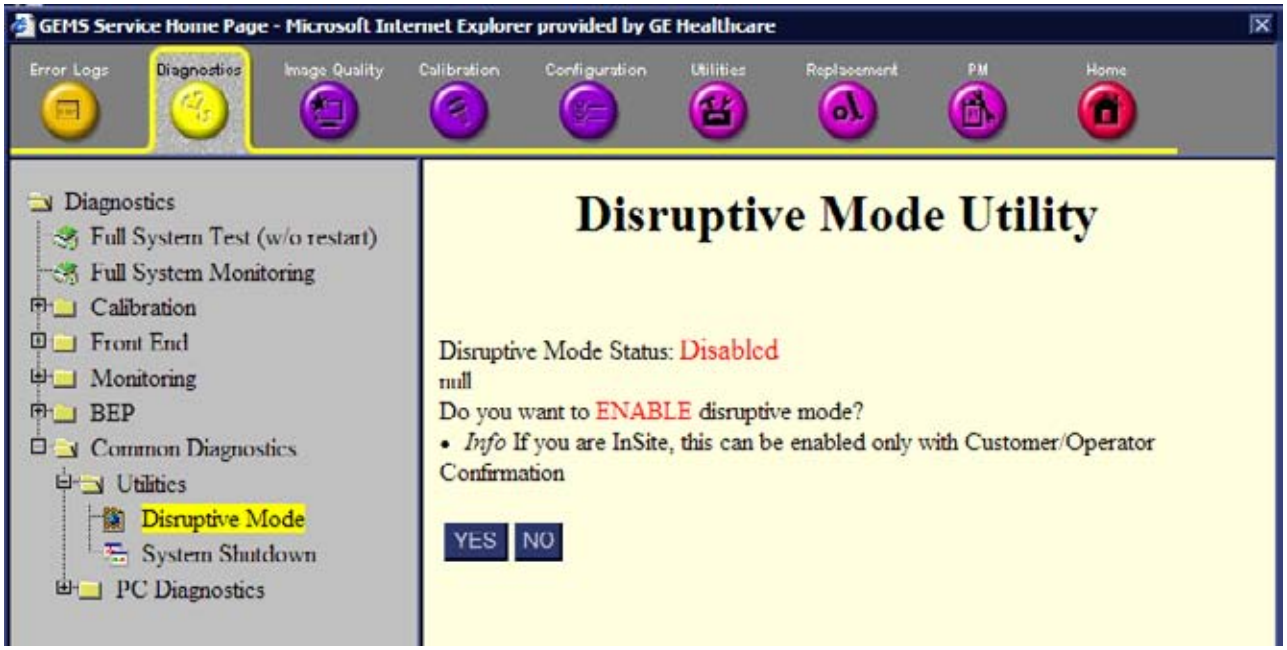

Figure 7-123 Request for Disruptive Mode

- **Disk Usage** - displays available disks and their utilization in the system - see Figure 7-124.

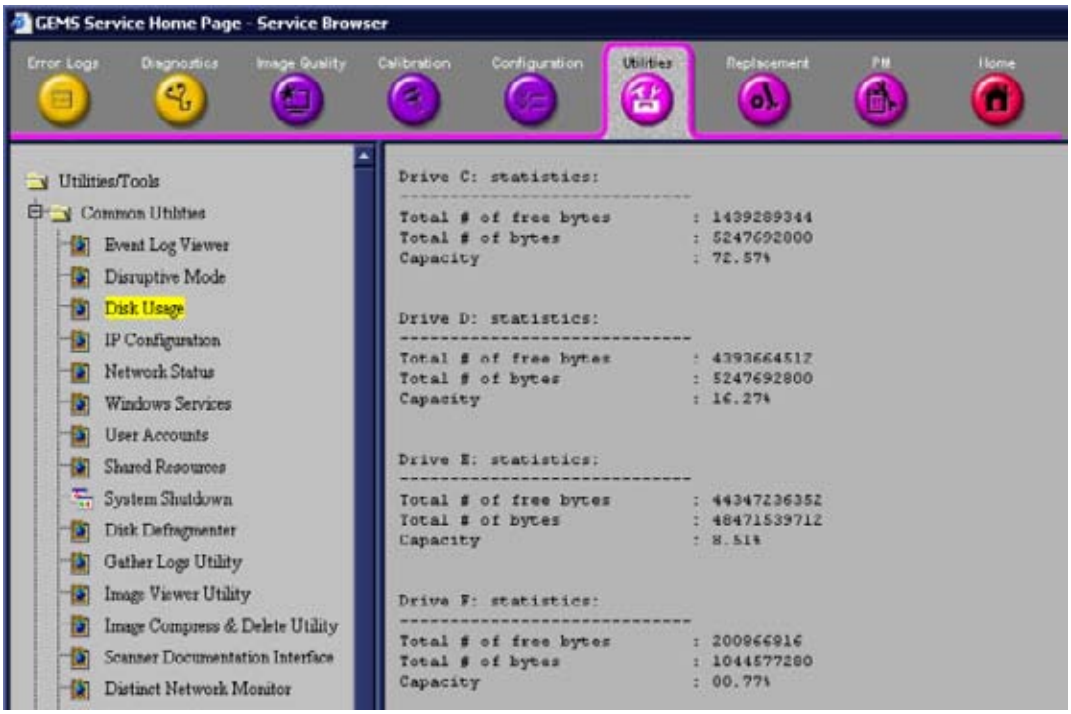

Figure 7-124 Disk Usage

- **IP Configuration** - displays IP information required by the FE or OLC - see Figure 7-125.

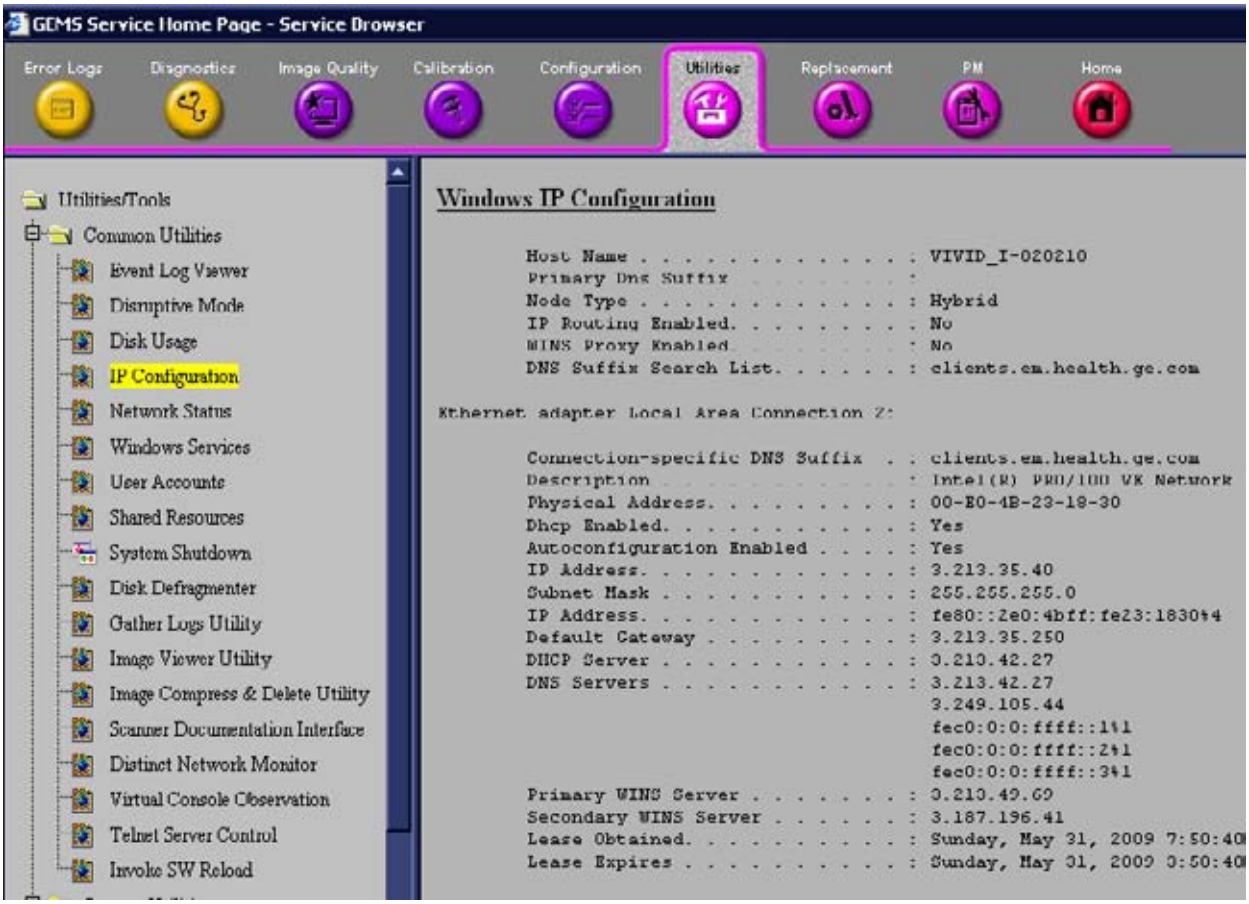
GEMS Service Home Page - Service Browser
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Common Utilities
Event Log Viewer
Disruptive Mode
Disk Usage
IP Configuration
Network Status
Windows Services
User Accounts
Shared Resources
System Shutdown
Disk Defragmenter
Gather Logs Utility
Image Viewer Utility
Image Compress & Delete Utility
Scanner Documentation Interface
Distinct Network Monitor
Virtual Console Observation
Telnet Server Control
Invoke SW Reload
Windows IP Configuration
Host Name . . . . . : VIVID_I-020210
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled . . . . . : No
DNS Suffix Search List. . . . . : clients.em.health.ge.com
Ethernet adapter Local Area Connection 2:
Connection-specific DNS Suffix . : clients.em.health.ge.com
Description . . . . . : Intel(R) PRO/100 VE Network
Physical Address. . . . . : 00-E0-4B-23-18-30
Dhcp Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IP Address. . . . . : 3.213.35.40
Subnet Mask . . . . . : 255.255.255.0
IP Address. . . . . : fe80::2e0:4bff:fe23:1830%4
Default Gateway . . . . . : 3.213.35.250
DHCP Server . . . . . : 3.213.42.27
DNS Servers . . . . . : 3.213.42.27
3.249.105.44
fec0:0:0:ffff::1%1
fec0:0:0:ffff::2%1
fec0:0:0:ffff::3%1
Primary WINS Server . . . . . : 3.213.49.69
Secondary WINS Server . . . . . : 3.187.196.41
Lease Obtained. . . . . : Sunday, May 31, 2009 7:50:40
Lease Expires . . . . . : Sunday, May 31, 2009 9:50:40

Figure 7-125 IP Configuration

- **Network Status** - displays information concerning the system's communication with the network - see Figure 7-126.

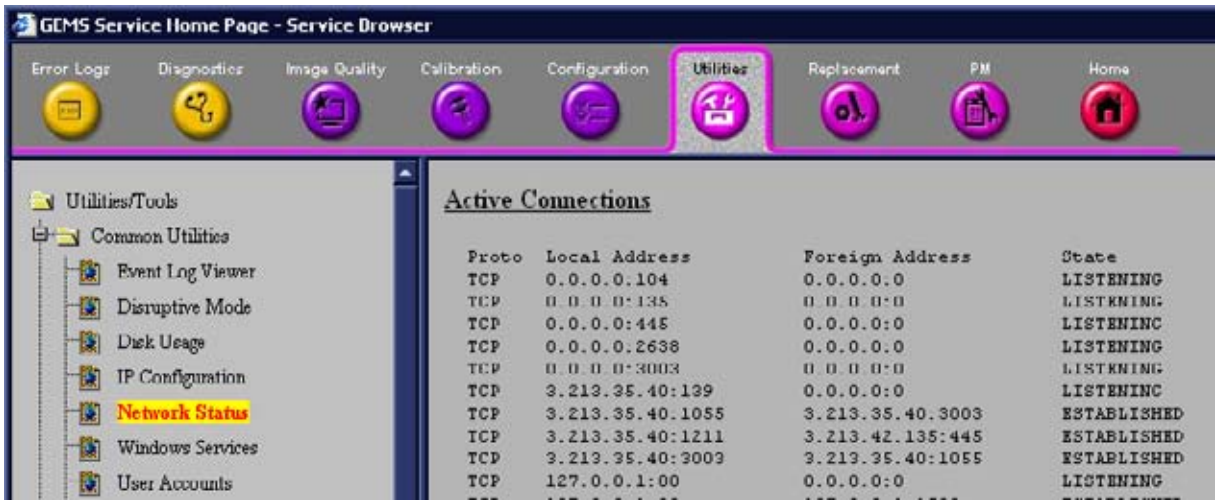

Figure 7-126 Network Status

- **Windows Services** - information concerning Windows applications invoked by the system - see Figure 7-127.

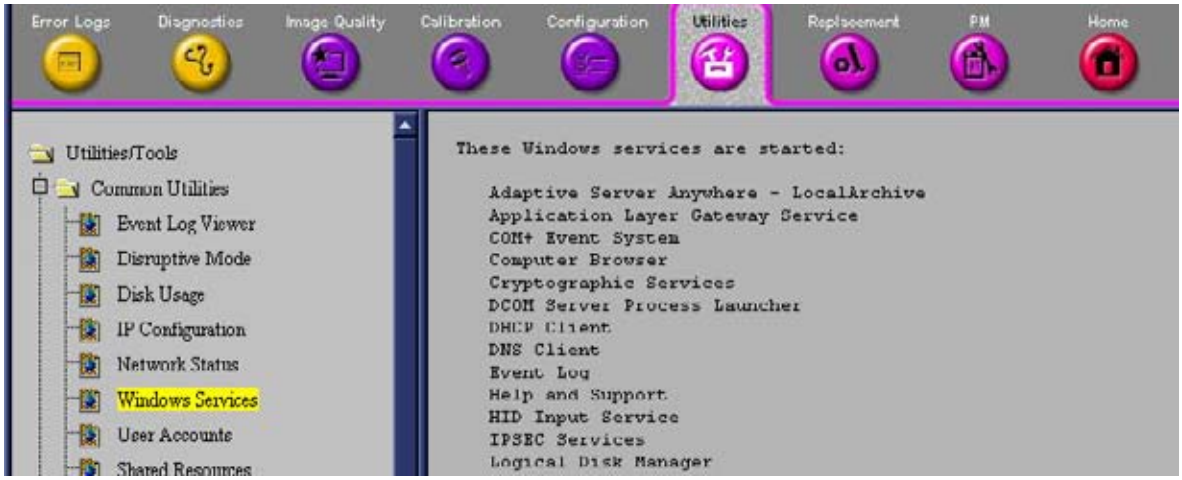

Figure 7-127 Windows Services

- **User Accounts** - states those users registered on the system - see Figure 7-128.

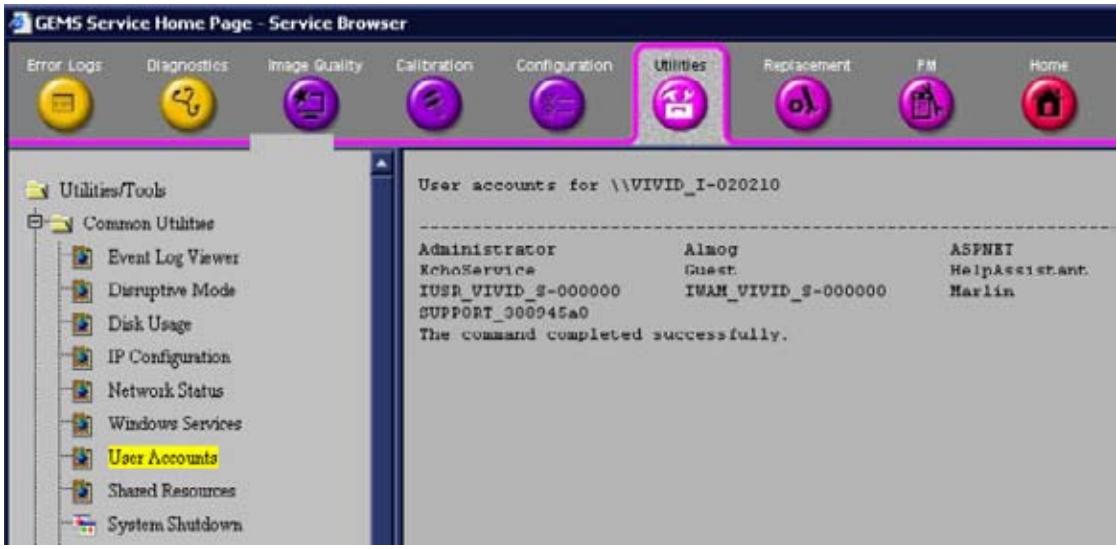

Figure 7-128 User Accounts

- **Shared Resources** - indicates those system resources accessible from the network - see *Shared Resources* section, page 7-161.

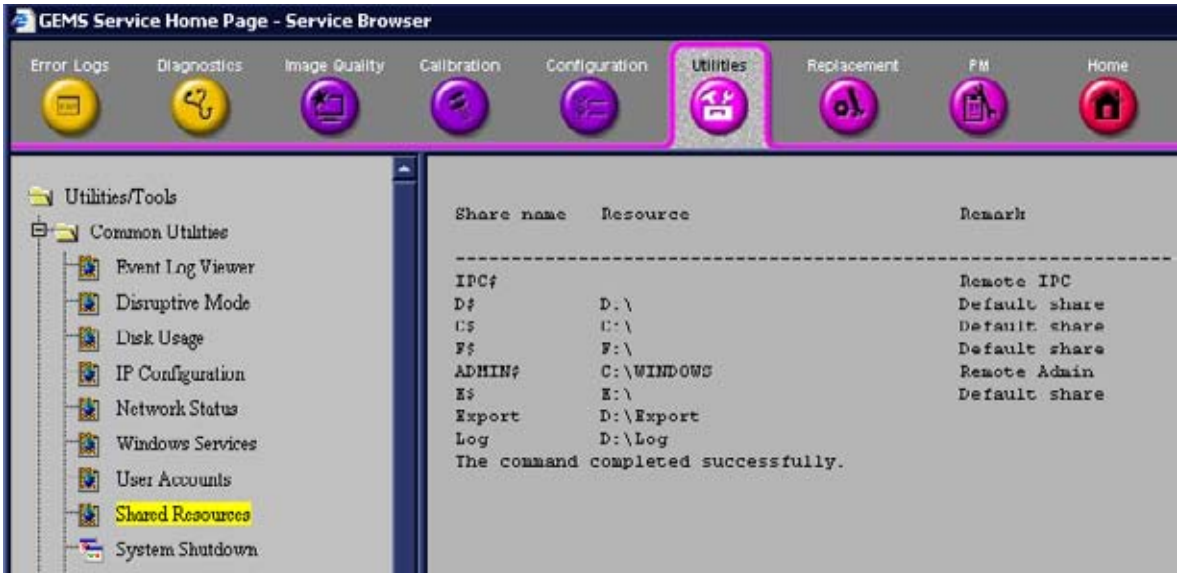

Figure 7-129 Shared Resources

- **System Shutdown** - see Figure 7-130.

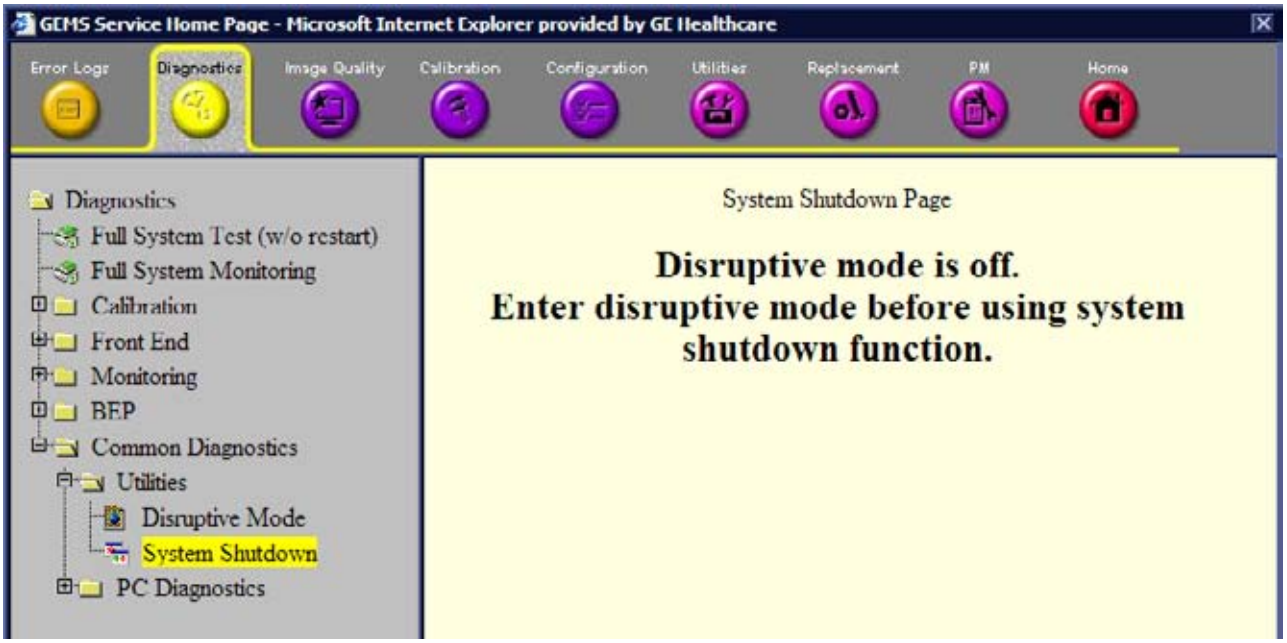

Figure 7-130 System Shutdown

- **Disk Defragmenter** - to invoke Windows disk defragmenter utility - see Figure 7-131.

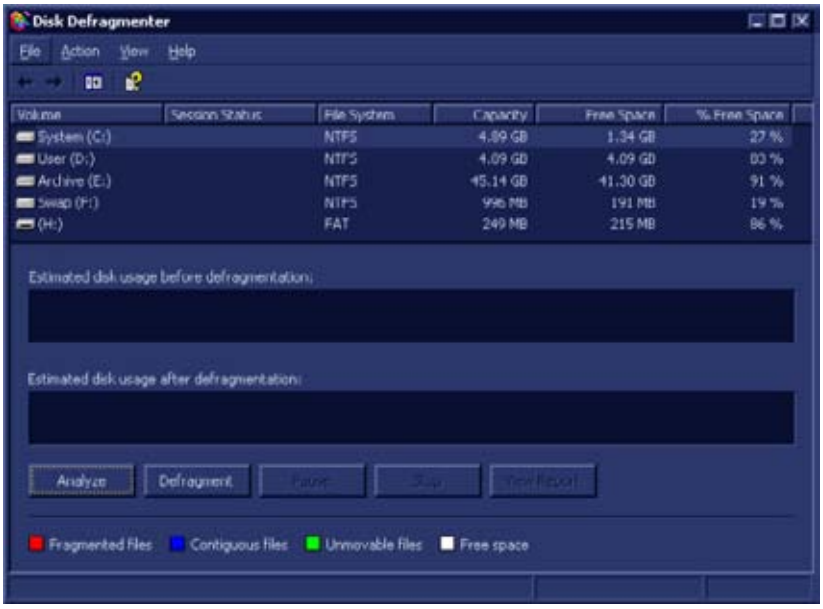

Figure 7-131 Disk Defragmenter

- **Gather Logs Utility** - accumulates the logs available in the system in D:\Export from where the OLC can download them - see Figure 7-132.

Figure 7-132 Gather Logs Utility

- **Image Viewer Utility** - enables the user to save images for further viewing by the OLC - see Figure 7-132.

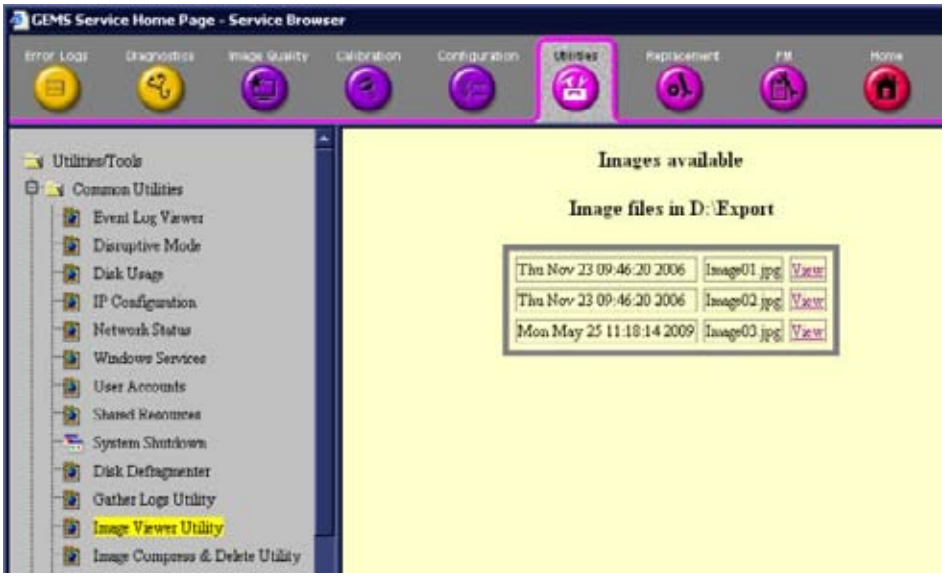

Figure 7-133 Image Viewer Utility

- **Image Compress and Delete Utility** - enables the OLC to compress images for downloading and deleting redundant files from D:\Export - see Figure 7-134.

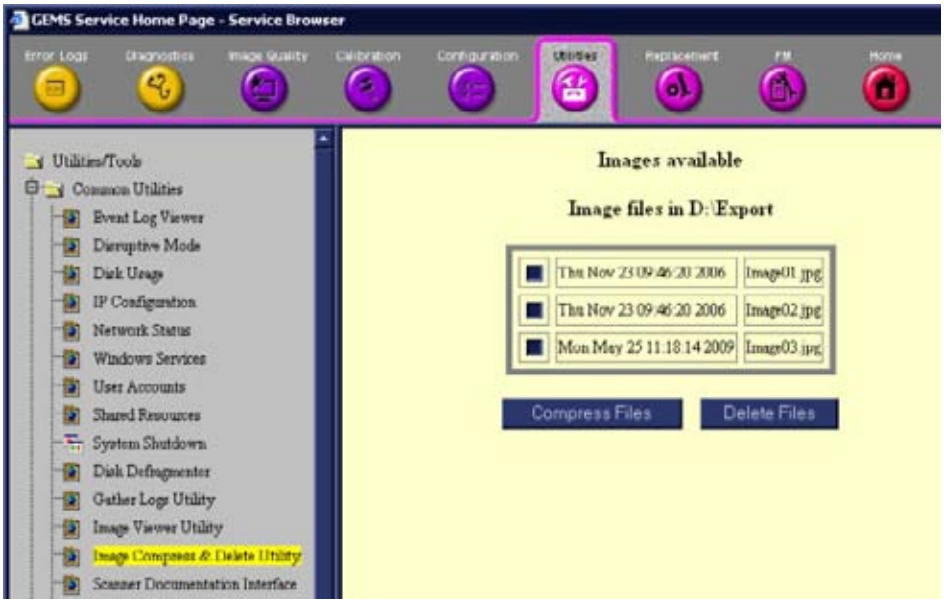

Figure 7-134 Image Compress and Delete Utility

- **Scanner Documentation Interface** - enables the system to read a DOC CD if present in a CD-DVD device - Figure 7-135.

Figure 7-135 Scanner Documentation Interface

- **Distinct Network Monitor**

  This feature is not supported.

- **Virtual Console Observation** - this is started once the Disruptive mode has been invoked. See Figure 7-136.

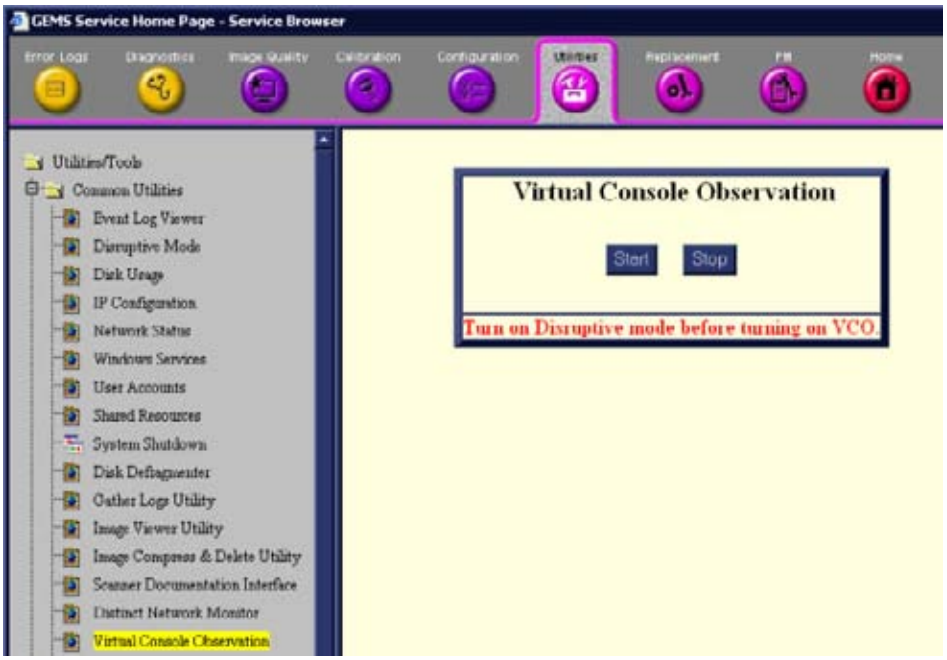

Figure 7-136 Virtual Console Observation

- **Telnet Server Control** - this feature is not supported.

- **Invoke SW Reload**

  To invoke Software Reload:

  1.) From the system, click **Invoke Software Reload** in the left pane of the screen (Figure 7-137).

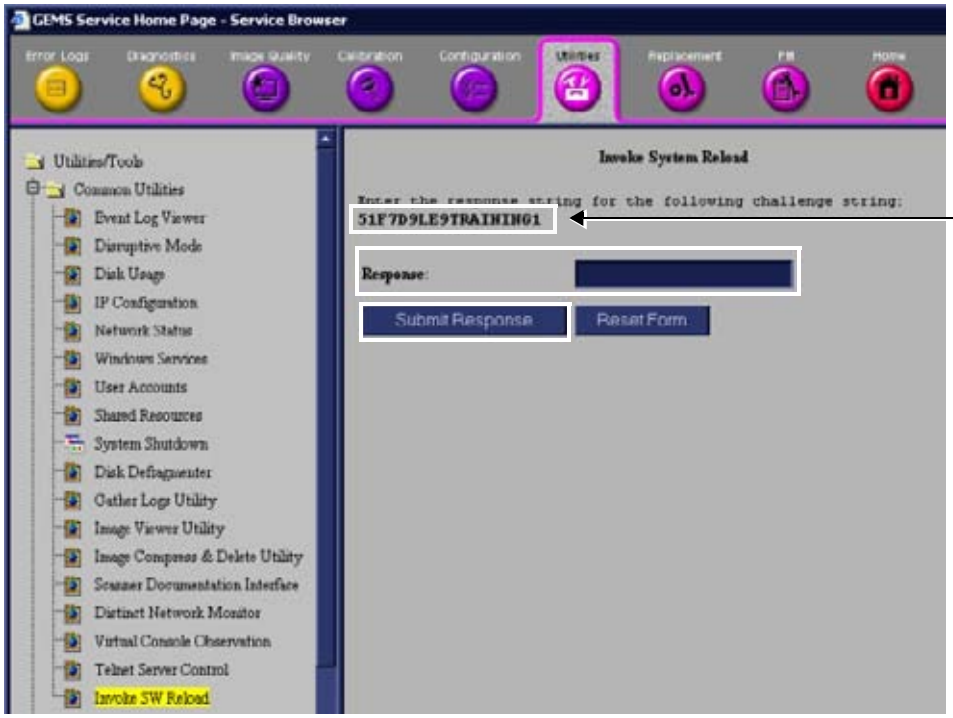

Figure 7-137 Invoke Software Reload

  2.) Make a note of the Challenge string displayed in the *right* pane of the Invoke Software screen (Figure 7-137, above).

  3.) From your PC, open Grub Challenger MFC - see Figure 7-138.

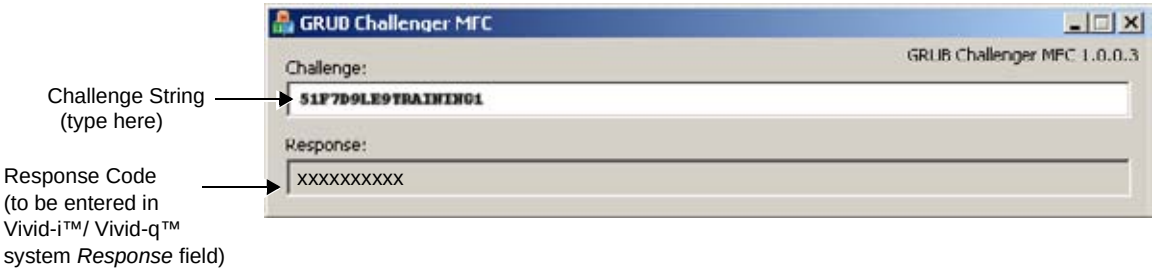

Figure 7-138 Grub Challenger MFC

  4.) Type the Challenge string in the Challenge field.

  A Response code is displayed below the Challenge string in the Grub Challenger screen - see Figure 7-138.

  5.) Make a note of the displayed Response code.

6.) On the Vivid-i™/ Vivid-q™ system, type the Response code in the **Response** field in the pane on the right (refer to Figure 7-137).

The following screen (Figure 7-139) displays a message stating that the Reload Setup was successful.

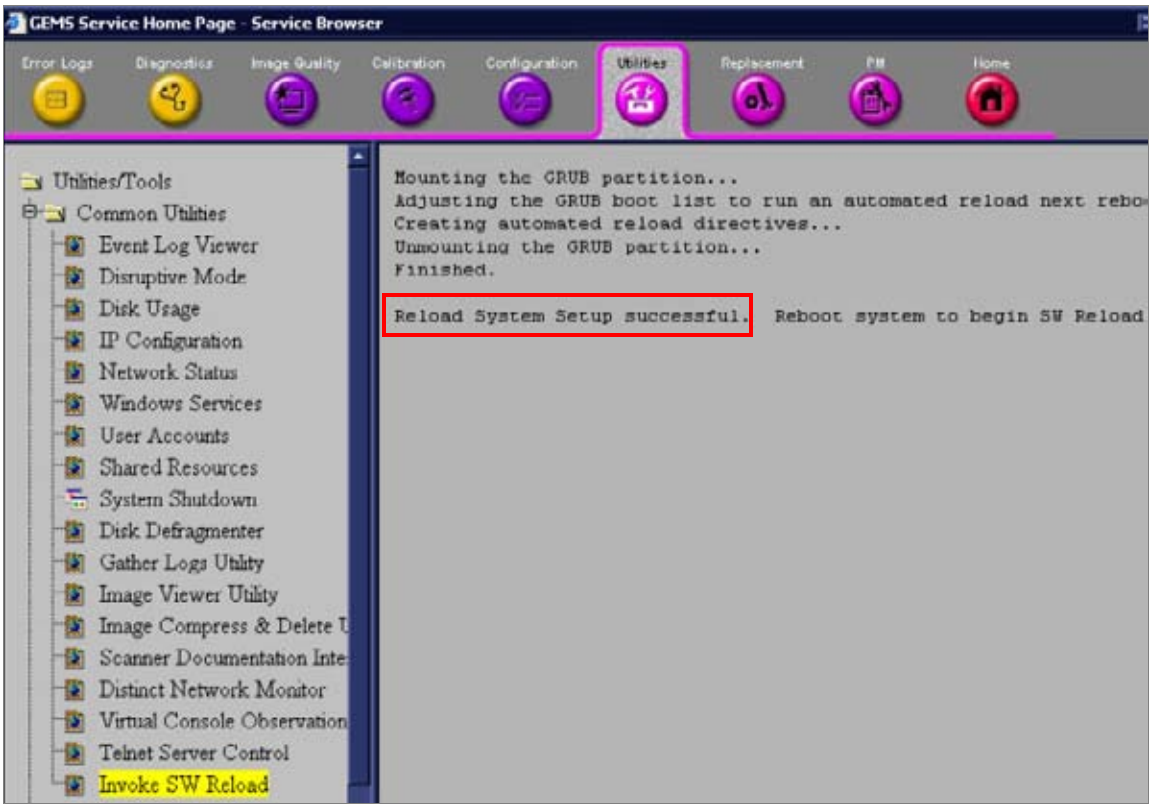

Figure 7-139 Invoke SW Reload - Confirmation Message

7.) Reboot the system, as explained in the User Manual:

* Vivid-i™/ Vivid-q™system: see "Switching On/Off", Vivid-i™/ Vivid-q™ User Manual, R2424431-100 Rev. 1, page 79.

The software reload process begins automatically.

7-7-7-2 Scanner Utilities

- Resource File Utility - see Figure 7-140.

Figure 7-140 Resource File Utility

7-7-7-3 DICOM Verify

Refer to Figure 7-141.

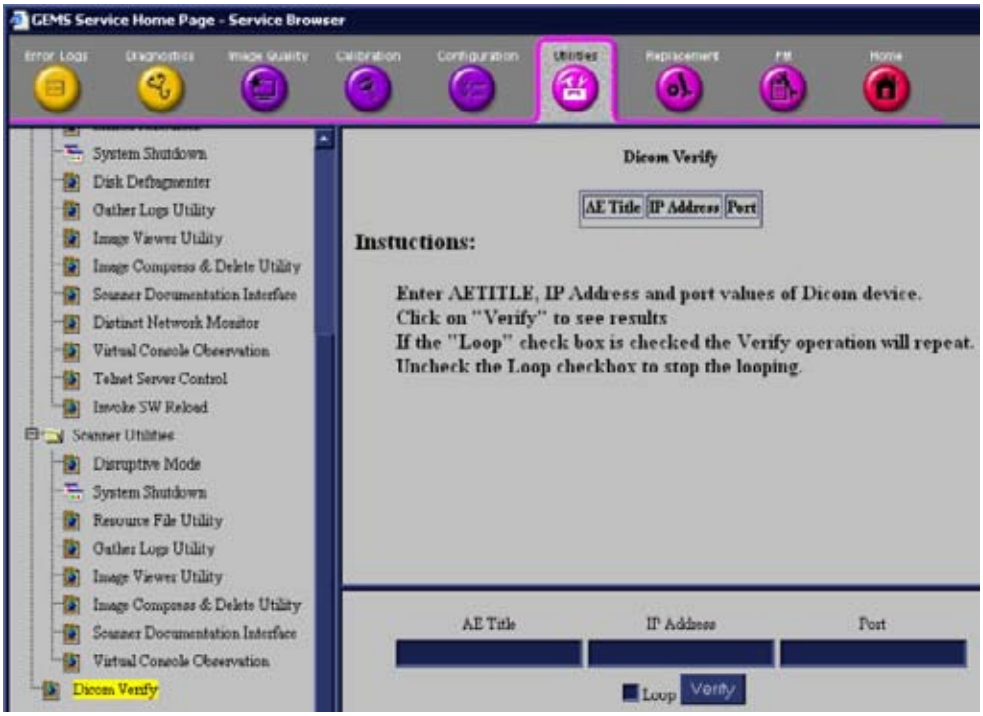

Figure 7-141 DICOM Verify

7-7-8 Replacement Page

When the *Replacement* page is selected, as shown below, part replacement details and ordering information is displayed, as described in *Chapter 9 - Renewal Parts*.

Figure 7-142 Replacement Page

Note: This page is not populated in this version.

7-7-9 PM Page

When the *PM* page is selected, as shown below, information about planned, proactive and preventive maintenance is displayed, as described in *Chapter 10 - Care and Maintenance*.

Figure 7-143 PM Page

Note: This page is not populated in this version.

Section 7-8
Automatic Error Log

The Vivid-i™/ Vivid-q™ automatically logs the software activity, sequences and error messages that occur during normal operation. Each day's activity is compressed into a single daily logger report, with a time stamp appearing in each line of the report. Additional user comments and screen captures, can also be included in the report. Each day's report is saved in the system for 90 days, during which time they can be recalled and saved to disk.

7-8-1 Adding Bookmarks

One of the new features added in version BT06 is the ability to add bookmarks. When a problem occurs during regular use of the system, simply press **< Alt+B >**. This action will insert a "bookmark" into the system failure logs. The message *Log is Bookmarked* will be displayed on the prompt line, as shown in the example in Figure 7-144.

Figure 7-144 Message Showing Bookmark Added to Log

The bookmark will allow users to place a time-stamp where a particular problem has occurred, while continuing with their current activity with minimum interruption.

Note: The log file bookmark will later make it easy for service engineers to locate the location of the failure logging more precisely.

7-8-2 Extracting Logs

Whenever log extraction is necessary due to the occurrence of an error that needs to be reported, or any other reason, follow the instructions below:

1.) While the system is turned-ON in any mode, press **<ALT + D>** on the alphanumeric keyboard.

The System Problem Reporting dialog opens - see Figure 7-145 on page 7-171.

2.) In the *Description of Issue* window, type a description of the problem.

Notes should be made regarding the selected probe, the imaging mode and the application that was being used at the time of the malfunction.

If applicable, try to describe the button or key-pushing sequence that immediately preceded the problem.

If applicable, activate the System Lockup checkbox.

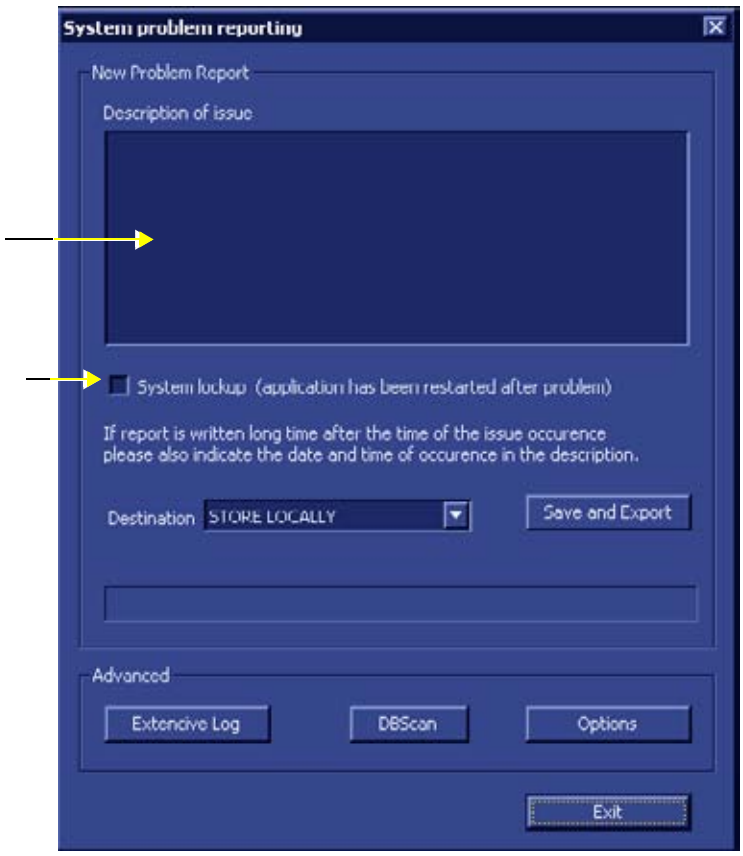

Figure 7-145 System Problem Reporting Dialog

3.) If use of the Advanced features is required, proceed to the following instructions, as applicable:

- Enabling Extensive Logging on page 7 - 173
- Advanced Options on page 7 - 175
- DB Scan on page 7 - 178

After the required advanced features have been selected, continue with step 4 and step 5, below.

4.) From the *Destination* drop-down menu, select the required export destination (DVD/CD or Memory Stick) then click **Save and Export**.

A Zip file (named "logfile_<date>_<time>.zip") is copied onto the selected removable media.

Note: Previously, users were required to save log files before exporting them. With version BT06, these two operations are performed as one step.

IMPORTANT When selecting DVD/CD as the export destination, first make sure that the DVD/CD has been formatted. For details, see Formatting a DVD/CD on page 7 - 172.

5.) When done, click the **Exit** button.

The System Problem Reporting dialog closes.

6.) Press **<Ctrl>+E** to eject the media.

7-8-2-1 Formatting a DVD/CD

Prior to exporting logs or any data onto a DVD/CD, the media must be formatted, as described below.

To Format a DVD/CD:

1.) Connect the DVD/CD-RW media drive to the USB port and make sure the DVD/CD-RW power switch on the rear of the drive is set in the **External** position, as shown in Figure 7-146, below.

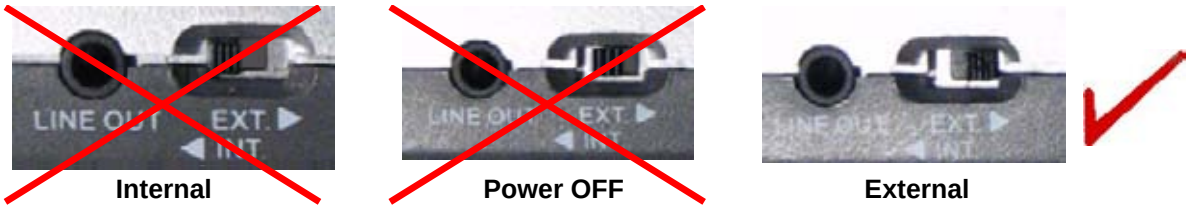

Figure 7-146 Power Switch in External Position

2.) Insert the blank DVD/CD media into the DVD/CD-RW drive tray.

NOTICE **IMPORTANT: Use only CD-R, DVD-R or DVD+R media from a reputable vendor and only high-grade media types.**

3.) On the Vivid-i™/ Vivid-q™ system, press the **<Config>** key.

4.) Select the **Connectivity** Tab and activate the **Tools** Tab.

5.) Under *Removable Media*, select the media type **CD/DVD Writeable** from the Media drop-down menu, as shown in Figure 7-147.

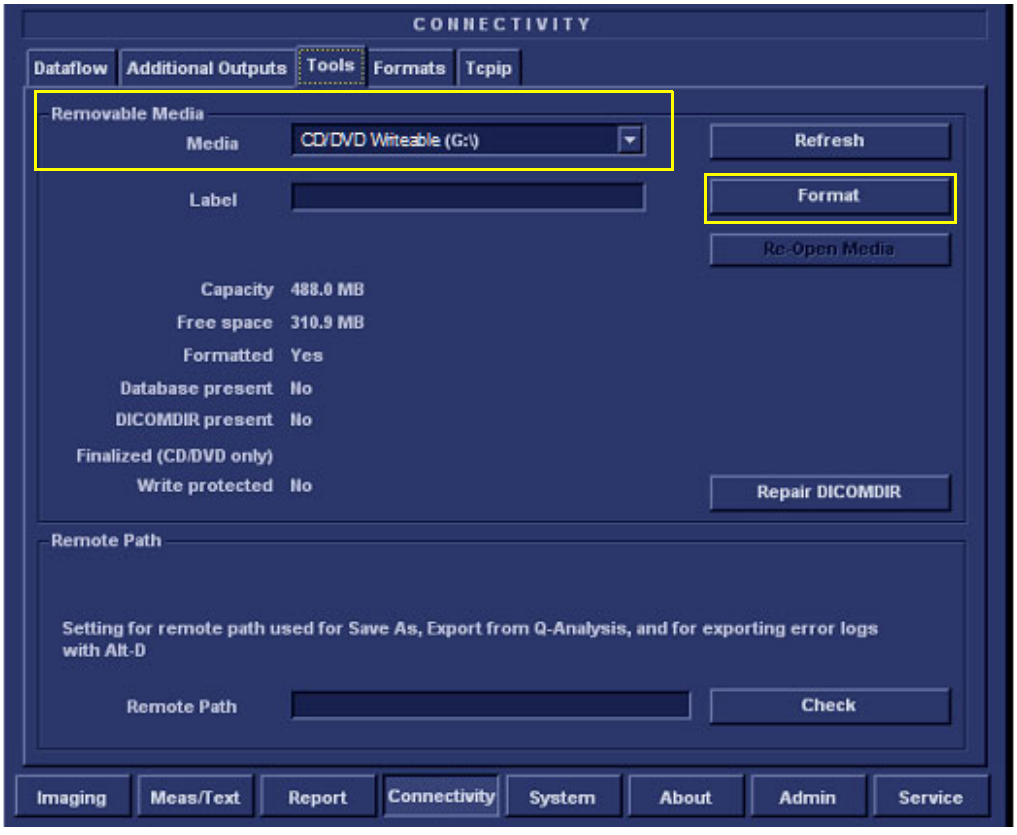

Figure 7-147 Connectivity - Tools - Removable Media

6.) Click the **Format** button.

When DVD/CD formatting is complete, a formatting successful message is displayed together with details of the DVD/CD capacity.

7-8-2-2 Enabling Extensive Logging

NOTE: In some cases, the user may need to activate the Extensive Logging feature. This will allow the system to record logs in a more detailed format, specifically addressing an issue of suspected failure.

As shown in Figure 7-148 on page 7-174, checkboxes provided in the Extensive Logging dialog enable the user to activate the appropriate failure category (any one or more; any combination) to collect more information regarding particular functionality.
Table 7-4 provides recommendations for activating a specific Extensive Log category.

Table 7-4 Extensive Log Categories and Failure Scenarios

Extensive Log Category	Type of Failure
Archive	Loss of patient information or images
	System lock-up due to database corruption
	Display of message warning that the archive is corrupted
	Any suspicion that there may be a problem with the archive
Connectivity	Network is not set up correctly
	Losing network connection
	Problems connecting to a DICOM server (or Reviewing Station)
	Problems with workflow
Front End	Impaired image quality
	Probe not detected
	System boots-up into Fake Mode (no Front End detected)
	Noise, artifacts, etc.
Media Handling	System Lock-up when using removable media (MOD, DVD/CD, Disk-on-Key)
	Removable media corrupted during back-up or export
	Removable media not detected
Power Management	Image not sufficiently intense
	Battery charging failed
	System boot-up fails intermittently
	System lock-up during mid-process

1.) Perform step 1 and step 2 on page 7-170.

2.) Click the **Extensive Log** button (refer to Figure 7-145 on page 7-171).

The Extensive Logging dialog opens - see Figure 7-148, below.

3.) Flag the appropriate checkboxes to activate the categories for which detailed analysis is required (refer to the recommendations in Table 7-4).

Figure 7-148 Extensive Logging Dialog

Note: The impact of activating a checkbox would be to generate larger, detailed log files. After usage, make sure to return to the default settings (unflagged) to conserve the size of the log files. After 7 days, the system will automatically return to the default settings.

4.) When done, click **OK**.

The Extensive Logging dialog closes.

7-8-2-3 Advanced Options

1.) From the System Problem Reporting dialog (Figure 7-145 on page 7-171), click the **Options** button.

The Advanced Export Options screen opens as shown in Figure 7-149.

Note: The Advanced Export Options allows you to:

a.) Control the size of log files.

b.) Specify some optional attachments to be added to the log files.

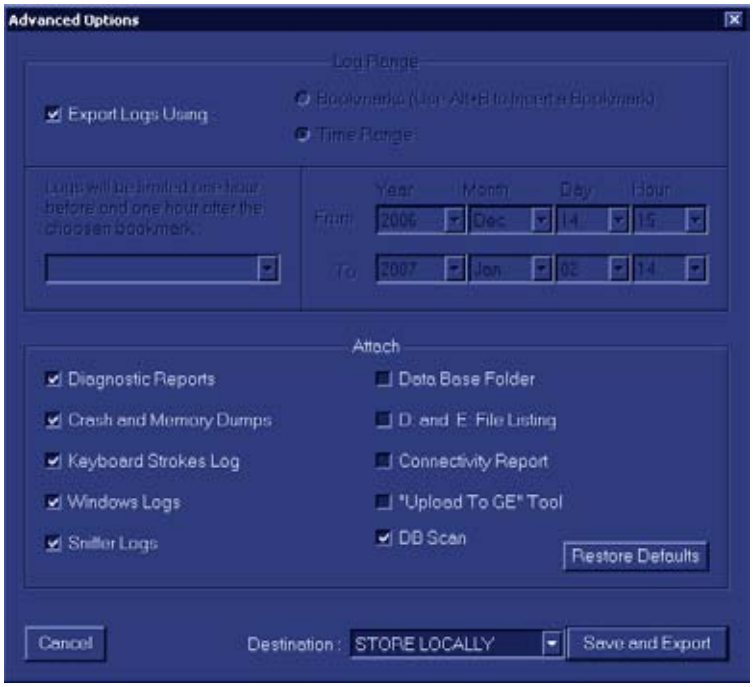

Figure 7-149 Advanced Export Options Dialog

2.) Proceed to select the appropriate settings, as described below.

7-8-2-3-1 Setting the Log File Ranges

Note: By default, the log files may be very large as they are not limited by time/date. The user is able to limit the size/timeframe of the log files by choosing the required settings, as described below.

1.) Activate the **Export Logs Using** checkbox, as shown in Figure 7-149, above.

2.) Proceed to set the required *Log Range*, as follows:

Either:

Activate the **Time Range** radio button, then use the *From:/To:* drop-down lists to define the required time range.

Or:

Activate the **Bookmark** radio button, then select the required Bookmark from the drop-down list of bookmarks.
This will export log files which are limited to the range of 1 hour before through 1 hour after the selected bookmark.

7-8-2-3-2 Setting the Log File Attachments

Note: In the Advanced Export Options dialog, from the lower area (labelled **Attach** - see Figure 7-149 on page 7-175) users may flag the different items they may wish to attach to the log files (or alternatively disable the checkboxes for those not required).
Table 7-5 outlines the different categories of information that may be attached to a log file.

Table 7-5 Attachment Categories and Recommendations for Use

Category	Type of Information and Recommended Use
Diagnostic Reports	Should be used whenever a diagnostic test has failed and it is necessary to forward the information to GE Medical Systems for analysis.
Crash and Memory Dumps	Useful for any type of memory crash or system lock-up problem.
Keyboard Strokes Log	Shows the keyboard strokes that were recorded by the system - may be useful in detection of a specific error.
Windows Logs	Contains the Windows operating system logs - supports the application operation.
Sniffer Logs	Applicable if the Network Sniffer Log has been used.
Data Base Folder	Provides more Archive information. Useful for loss of patient information and/or analysis of database, archive, or back-up problems.
D: and E: File Listing	Lists all file names and locations in the hard disk drives: **D** and **E**. Useful in the event of loss of patient information, missing images, lock-up problems, etc.
Connectivity Report	Provides details on the connectivity configuration. Recommended to include this whenever any type of connectivity problem arises.
"Upload to GE" Tool	Enables the user to export the log directly to GE Medical Systems for analysis. For details, see Sending Log Files to GE on page 7 - 177.
DBScan	Log files created when performing a scan of the database contain useful information regarding the integrity of the database.

1.) Make sure the required Log File Ranges are set, as previously described.
2.) Under **Attach**, use the checkboxes provided to flag the required attachments, as appropriate.

Note: Clicking the *Restore Defaults* button returns to the default setting whereby all checkboxes in the *left* column are flagged and all on the *right* are disabled, as shown Figure 7-149.

3.) When done, from the *Destination* drop-down menu, select the required export destination (CD or Memory Stick) then click **Save and Export**.

A Zip file (named "logfile_<date>_<time>.zip") is copied onto the selected removable media.

Note: Previously, users were required to save log files before exporting them. With version BT06, these two operations are performed as one step.

IMPORTANT When selecting DVD/CD as the export destination, first make sure that the DVD/CD has been formatted. For details, see Formatting a DVD/CD on page 7 - 172.

When export is completed, a message is displayed saying (number of) reports successfully exported.

4.) Click OK to close the window.
5.) When export completed, press **<Ctrl>+E** to eject the media.

7-8-2-3-3 Sending Log Files to GE

After exporting logs (with the **Upload To GE Tool** attachment) to the selected media (i.e.DVD/CD or Memory Stick), the media contains the zipped log file along with the binary (**UploadLog.exe** and other attachments) files that perform the upload of all exported files to the GE ftp site.

NOTE: Successful upload of logs to the GE ftp site can only be achieved when the designated PC is connected to the Internet and when all security measures (such as, firewalls) taken at the local network do not prevent the utility from performing the upload.

To Perform the Upload Procedure:

1.) Place the media in any Windows-based PC and run the **UploadLog.exe**.

The Upload Log dialog is displayed:

Figure 7-150 Uploading Log Files

2.) Click **Send**.

The upload process commences and the progress bar advances.

When the upload process finishes, the following message is displayed:

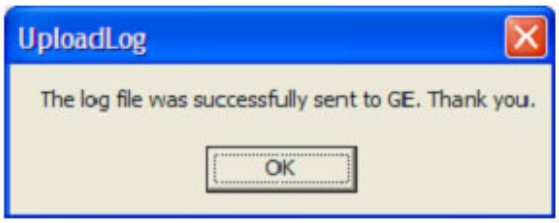

Figure 7-151 Upload Successful Message

3.) Click **OK**.

4.) Observe the progress bar completion, as shown in Figure 7-152.

Figure 7-152 Upload Complete

5.) Click **Close** to terminate and exit the Upload utility.

6.) Inform the local GE personnel that you have uploaded files to the GE ftp site.

Note: In the event that the upload process fails, check your local network security settings to make sure that they did not prevent the upload. Otherwise, contact GE personnel.

7-8-2-4 DB Scan

To Perform the Database Scan Procedure:

1.) Press **<ALT> + D**.

The System Problem Reporting dialog opens:.

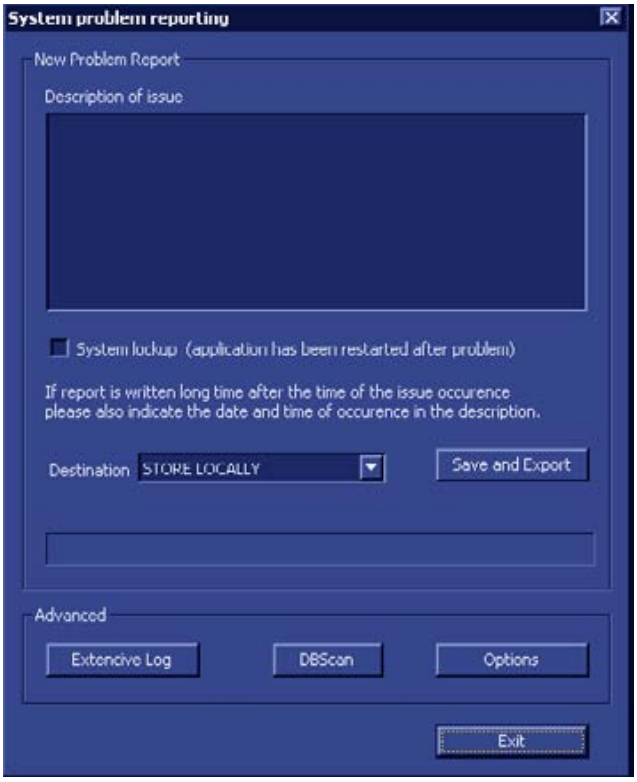

Figure 7-153 System Problem Reporting - Advanced

2.) Under *Advanced*, click on the **DBScan** button.

The Database Scanning procedure commences, and a progress bar is displayed together with the message: The action may take a long time. Please wait.....

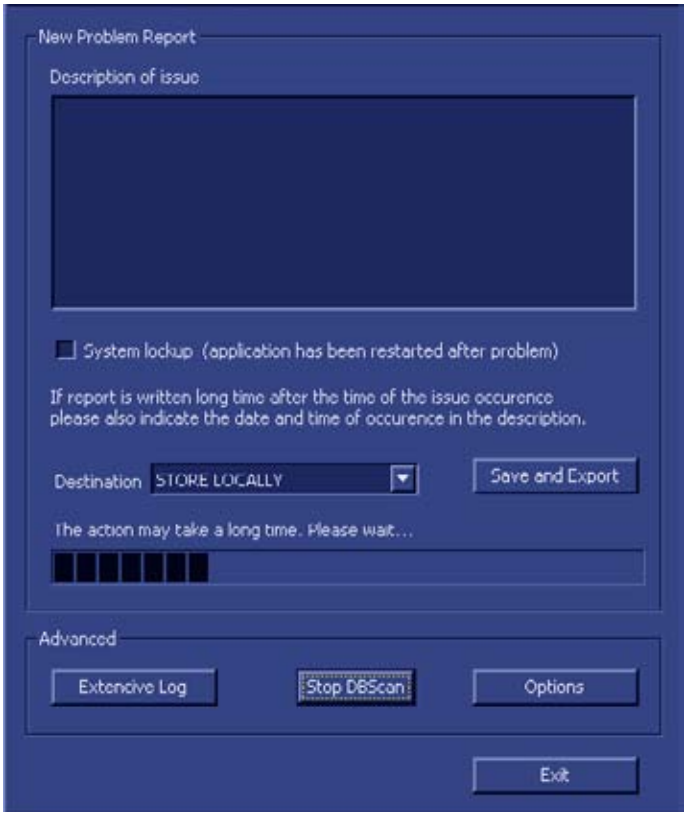
New Problem Report
Description of issue
System lockup (application has been restarted after problem)
If report is written long time after the time of the issue occurence
please also indicate the date and time of occurence in the description.
Destination
STORE LOCALLY
Save and Export
The action may take a long time. Please wait...
Advanced
Extencive Log
Stop DBScan
Options
Exit

Figure 7-154 Database Scanning Procedure in Progress

*During this procedure, a log file which contains information about the integrity of the database will automatically be created and stored in the **Logs** directory (in the folder name **Log**).*

If required, this log file may be sent as an attachment when exporting log files. For more details, see Setting the Log File Attachments on page 7 - 176.

7-8-2-5 Other Logs

Other available logs can be viewed via the Common Service Interface - refer to the Error Logs Page on page 7 - 140.

Chapter 8
Replacement Procedures

Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter provides replacement procedures for the Vivid-i™/ Vivid-q™ system parts, as outlined below.

Table 8-1 Contents in Chapter 8

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8-1	Overview	8-1
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	Battery Replacement Procedure	8-5
	Hard Disk Replacement Procedure	8-7
	Control Panel and Keyboard Replacement Procedure	8-16
	Rear Cover & Latch Assembly Replacement Procedure	8-26
	LCD Display Cover Hinges Replacement Procedure	8-28
	Bottom Assembly Replacement Procedure	8-32
	LCD Display Frame Replacement Procedure	8-34

Table 8-1 Contents in Chapter 8 (cont'd)

Section	Description	Page Number
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	TR32 and RFI Boards Replacement Procedure	8-39
	BEP Replacement Procedure	8-45
	BIOS Battery Replacement	8-52
	HVPS Replacement Procedure	8-53
	Fan Replacement Procedure	8-56
	Speaker Assembly Replacement Procedure	8-59
	LCD Display Replacement Procedure	8-60
	LCD Flex Cable Replacement Procedure	8-65
	Microphone Assembly Replacement Procedure	8-68
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Section 8-2
External Component Replacement Procedures

8-2-1 Bearing Handle Replacement Procedure

NOTE: The term "Bearing Handle" relates to the Vivid-i™/ Vivid-q™ portable carrying handle.

8-2-1-1 Tools

Use the appropriate flat and Phillips-type screw drivers as indicated in the Bearing Handle replacement procedure.

8-2-1-2 Time Required

10 minutes

8-2-1-3 Preparations

None

8-2-1-4 Bearing Handle Removal Procedure

1) Close the Vivid-i™/ Vivid-q™ LCD cover, making sure both front latches are securely fastened (Figure 8-1).

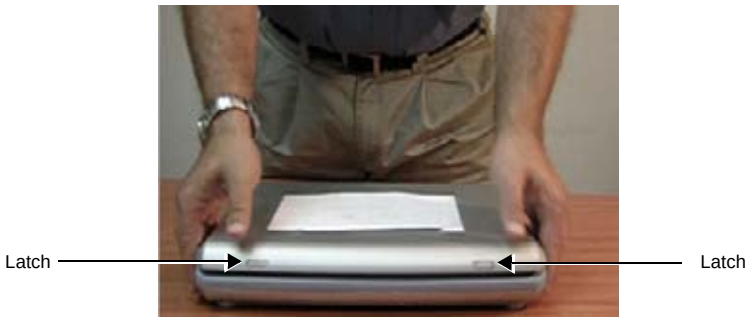

Figure 8-1 Closing Vivid-i™/ Vivid-q™ LCD Cover

NOTE: The following steps may be viewed in the attached movie clip.

2) Release the captive screw on either side of the Bearing Handle (there are two screws that secure the handle in position), by turning 1/4 turn in a *counterclockwise* direction (Figure 8-2).

Figure 8-2 Releasing the Bearing Handle Captive Screw

3) Using both hands, pull the Bearing Handle slightly apart to release it from the system.

4.) Remove the Bearing Handle.

Figure 8-3 Bearing Handle Removed

8-2-1-5 Bearing Handle Installation Procedure

1) Place a new Bearing Handle in position, using both hands to pull the Bearing Handle slightly apart in order to slot the ends into the handle holes on the Vivid-i™ casing.

2) Carefully fasten each captive screw on either side of the Bearing Handle to secure the handle in position, by turning 1/4 turn in a *clockwise* direction.

Note: When tightening the captive screws, do not use excessive force *do not apply more than 1/4 turn*; overtightening will damage the screw thread.

3) Proceed to perform the Bearing Handle Test on page 4 - 19.

8-2-2 Battery Replacement Procedure

8-2-2-1 Tools

None required.

8-2-2-2 Time Required

1 minute

8-2-2-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-2-4 Battery Removal Procedure

1) Disconnect the AC adapter and all cables from the Vivid-i™/Vivid-q™ portable ultrasound scanner.

NOTE: The following steps may be viewed in the attached movie clip.

2) Close the Vivid-i™/ Vivid-q™ LCD cover, making sure both front latches are securely fastened.

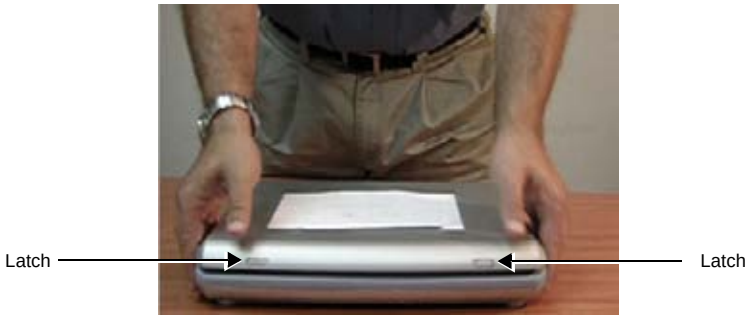

Figure 8-4 Closing Vivid-i™/ Vivid-q™ LCD Cover

3) Carefully turn the Vivid-i™/ Vivid-q™ over, placing it face down.

4.) While holding the Vivid-i™/ Vivid-q™ steady, pull the locking latch away from the battery and slide the battery sideways out of the battery compartment to remove it completely from the system.

Figure 8-5 Sliding the Battery out of the Battery Compartment

NOTE: WHEN REMOVING A DEFECTIVE BATTERY, ENSURE THAT IT IS DISPOSED OF IN ACCORDANCE WITH LOCAL REGULATIONS. ALTERNATIVELY, FORWARD IT TO GE MEDICAL SYSTEMS FOR PROPER DISPOSAL.

8-2-2-5 Battery Installation Procedure

WARNING: The Vivid-i™/ Vivid-q™ battery has a safety device.
***DO NOT ATTEMPT TO DIS-ASSEMBLE OR ALTER THE BATTERY*!**
Always observe the precautions listed in *Vivid-i™ and Vivid-q™ Battery Safety* on page 1 - 13**.**

CAUTION: USE ONLY BATTERIES APPROVED BY GE MEDICAL SYSTEMS AS SUITABLE FOR USE WITH THE VIVID-I™/VIVID-Q™ PORTABLE ULTRASOUND SCANNER

1) With the Vivid-i™/ Vivid-q™ lying face down (refer to Figure 8-5 on page 8-5), hold the unit steady with one hand while sliding the battery sideways into the battery compartment.
2.) Make sure the battery is properly inserted all the way, before pushing the locking latch to the closed position.
3.) Turn the Vivid-i™/ Vivid-q™ over, release the front latches and open the LCD cover.
4.) Reconnect the AC adapter and all cables to the Vivid-i™/Vivid-q™ portable ultrasound scanner.
5.) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
   - Chassis Current Leakage Test on page 10 - 24
   - Calibration Tests on page 7 - 25
   - Battery Parameters Test on page 7 - 103

8-2-3 Hard Disk Replacement Procedure

NOTE: When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

8-2-3-1 Tools

Use the appropriate flat and Phillips-type screw drivers as indicated in the Hard Disk replacement procedure.

8-2-3-2 Time Required

10 minutes

8-2-3-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-3-4 Hard Disk Removal Procedure

1) Make sure the Vivid-i™/ Vivid-q™ LCD Display cover is securely closed and that the scanner is standing firmly on a flat surface.

NOTE: The following step may be viewed in the attached movie clip.

2) Working from the rear of the scanner (rear panel), use a small Phillips screwdriver to loosen and remove the two screws that secure the Hard Disk in the hard disk module holder, as shown in Figure 8-6 below.

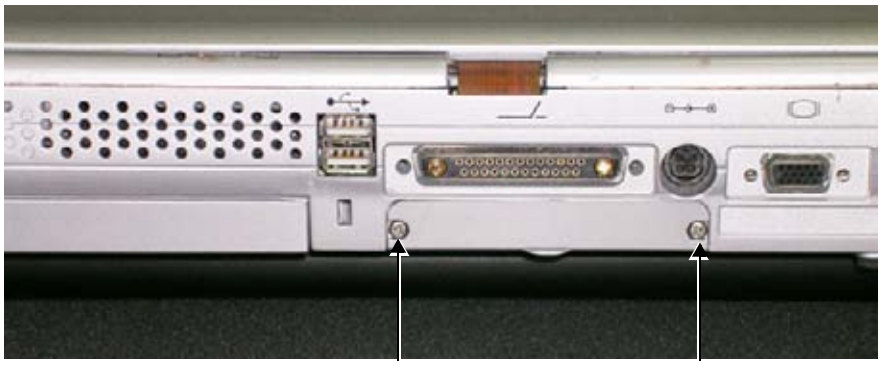

Figure 8-6 Removing the Screws from the Rear Panel

NOTE: The following step may be viewed in the attached movie clip.

3) With both hands, tilt the rear end of the scanner *upwards* then, holding it steady with one hand, remove the Hard Disk from the system by holding the grip and pulling it straight out of the hard disk module holder, as shown in Figure 8-7 below.

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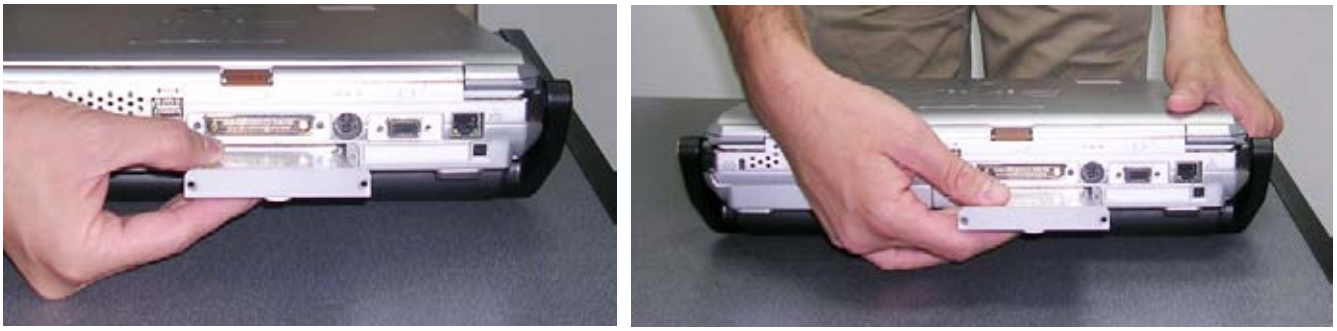

Figure 8-7 Removing the Hard Disk

8-2-3-5 Hard Disk Installation Procedure

NOTE: When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the Hard Disk Removal Procedure.

1) Place the new hard disk in position in the hard disk module holder - see Figure 8-7 on page 8-8.

2) Return and fasten the two screws (previously removed) to secure the Hard Disk in position - refer to Figure 8-6 on page 8-7.

Note: When a new hard disk arrives from the manufacturer, usually it is partitioned and ready for software installation.
Refer to Software Loading on page 8 - 101 for software installation instructions .

Note: IMPORTANT - if ***both*** the Hard Disk and Back End are being replaced simultaneously, it is necessary to re-configure the LCD type. Refer to the instructions provided in step 10 on page 8-63 through step 13 on page 8-64.

3.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-2-3-6 Hard Disk Duplication

NOTE: In some instances, it may be necessary to duplicate a customer's existing hard disk. The duplication procedure is performed using a USB to SATA / PATA adaptor. This will allow you to connect the original hard disk to another hard disk and copy the user content of Partition E (the Archive) and Partition D (User Definitions).

Figure 8-11 below illustrates the USB Hard Disk Connector and Power Supply. The USB-to-SATA/PATA adaptor (referred to in the procedure as "the adaptor") is shown in Figure 8-12.

Figure 8-11 USB Hard Disk Connector with Power Supply

①Power Adapter Jack(For 2.5" IDE HDD)
②Mini USB Port
③44-pin IDE plug for 2.5" IDE HDD
④SATA Connector
⑤40-pin IDE plug for 3.5" IDE Drives
⑥Power/HDD Activity LED

Figure 8-12 USB-to-SATA/PATA Adaptor

8-2-3-6-1 Patient Archive Transfer Procedure

1.) If the original hard disk is still working, perform the backup procedure and save all presets to a storage device.

2.) Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

3.) Disconnect the AC cable and battery.

CAUTION: DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:

1.ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP, TO THE ADVISED ESD CONNECTION POINT LOCATED ON THE REAR OF THE SCANNER (TO THE RIGHT OF THE POWER CONNECTOR).

2.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

4.) Remove the currently-installed hard disk from the Vivid-i™/ Vivid-q™ system as described in the Hard Disk Removal Procedure on page 8 - 7.

5.) Reconnect the AC cable and battery and power ON the Vivid-i™/ Vivid-q™ ultrasound unit.

6.) Perform a full software installation procedure, as described in Software Loading on page 8 - 101.

7.) Install new passwords provided by OTR to enable all options purchased by customer. Follow the instructions for Software Options Configuration on page 3 - 90**.**

8.) Restore Connectivity Settings (refer to Connectivity Settings on page 8 - 15). For step-by-step instructions, see Connectivity Configuration on page 3 - 105.

9.) Shut down the system.

10.) Disconnect all peripherals (USB and PCMCIA) from the system.

11.) Plug a Technical Support plug (dongle) into the USB port and boot-up the system. Exit to Windows, as described in Exit to Windows from the Vivid-i™/ Vivid-q™ Application on page 4 - 4.

12.) Connect the original hard disk (the hard disk that you previously removed from the system) to the appropriate port of the SATA/PATA adaptor. See the example in Figure 8-13.

Figure 8-13 PATA Hard Disk Connected to the USB-to-SATA/PATA Adaptor

13.) Plug the adaptor into the AC power outlet and verify that the power indicator light is ON.

14.) Plug the adaptor's USB cable into the system and wait a few seconds.

15.) Open the Explorer window (eight partitions will now be shown, as shown in Figure 8-14 below).

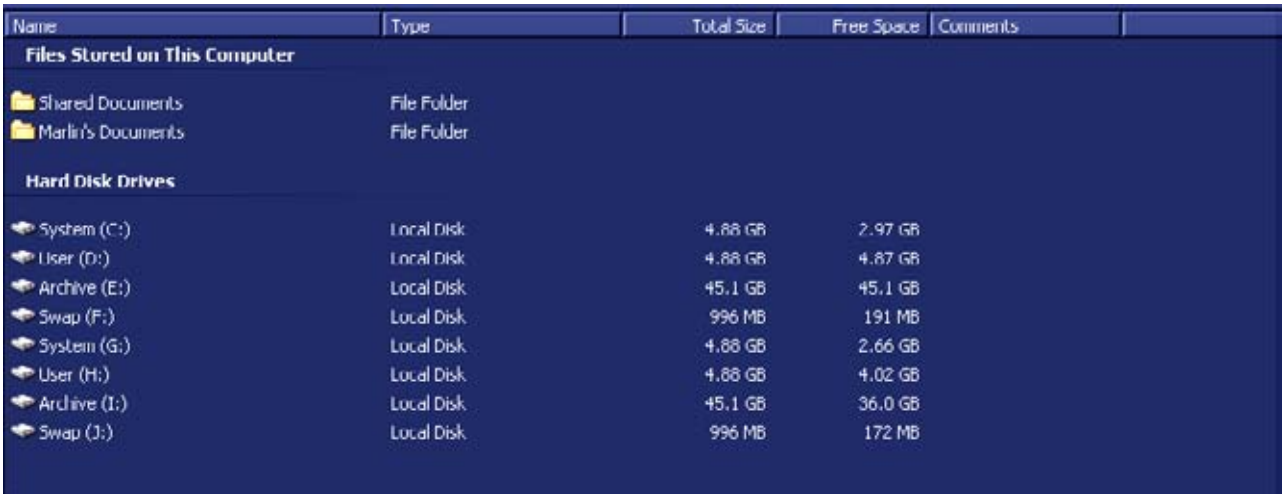

Figure 8-14 Explorer Window showing Eight Partitions

NOTE: The partition picture shown in Figure 8-14, above is based on Application Software Ver. 10.1.0 Build 68. This might not correspond exactly with the partition shown on your system - this depends on the application software version currently installed on your system.

16.) Check the Total Size and Free Space shown for partition **E** - the third partition**)** and the Total Size and Free Space of the second Archive partition in Figure 8-14, above.

17.) From the User partition (H: in Figure 8-14, above), copy the sub-directory **Marlin** into the User partition D:.
When the message *Overwrite?* is displayed, click **Yes**.
Wait until the copying process is complete (time required will depend on the size of the database).

18.) Disable the SQL Service by selecting **Start** > **Programs** > **Sybase SQL Anywhere 8** > **Sybase Central**, as shown in Figure 8-15 below.

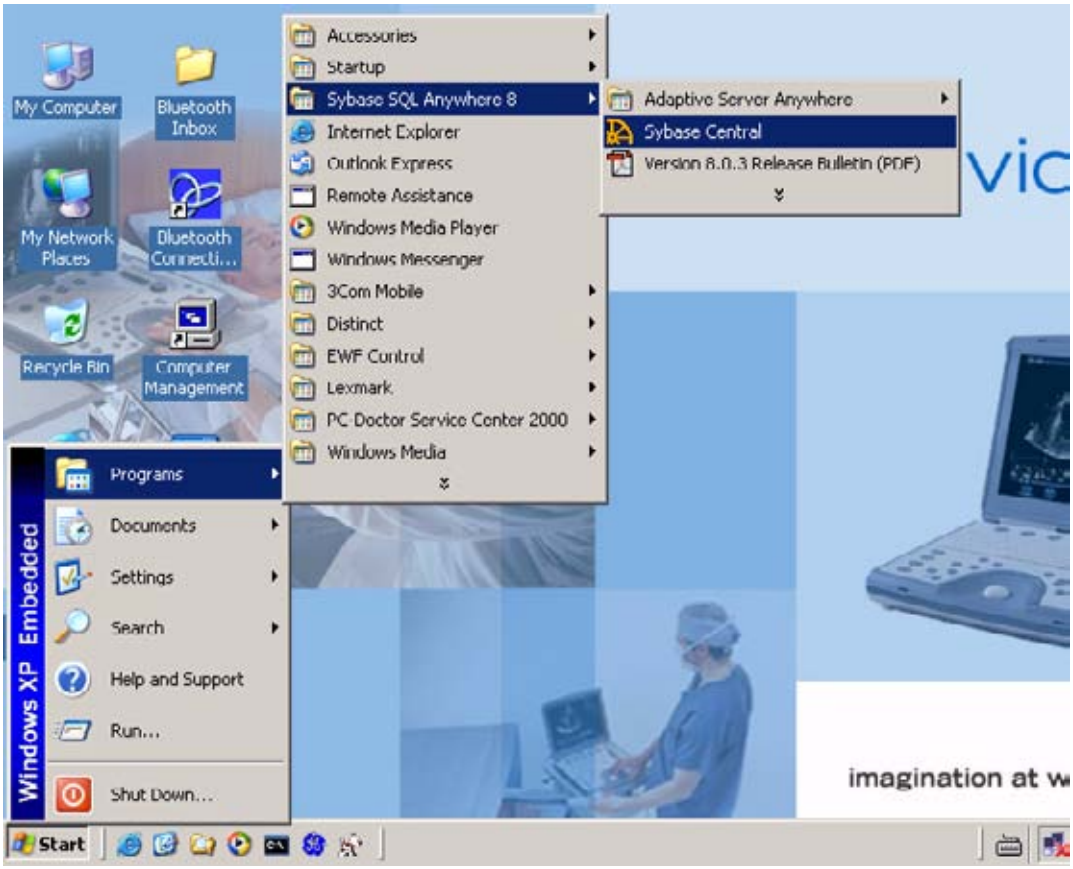

Figure 8-15 Disabling SQL Service

The Sybase Central sub-directory displays in the left pane - see Figure 8-16 below.

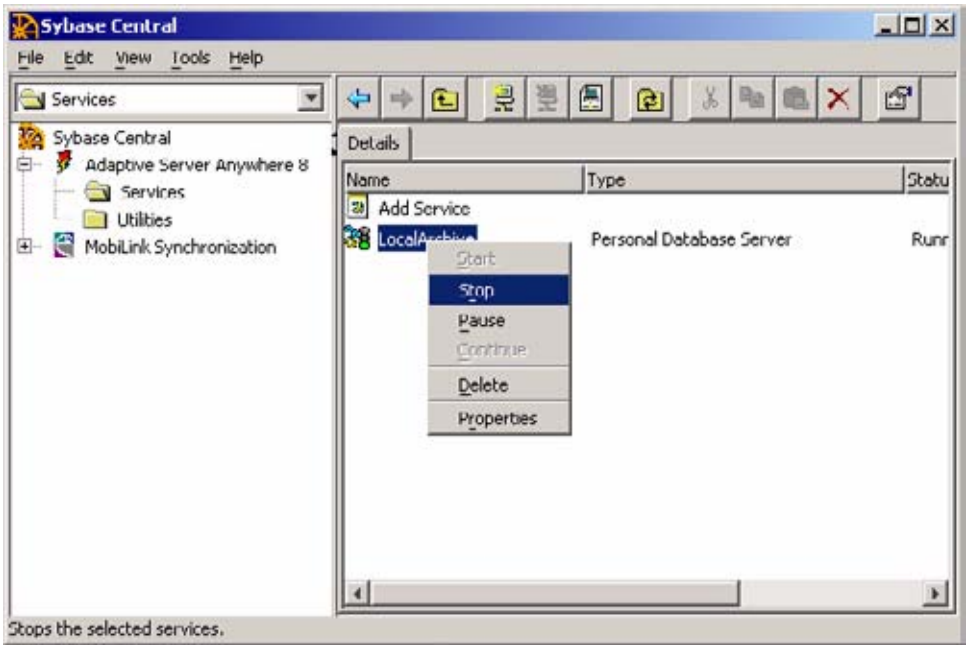

Figure 8-16 Sybase Central Dialog Box

19.) In the left pane under "Services", select **LocalArchive**.

20.) On the system console press the **Update/Menu** button and then on the screen click **Stop**.

The Local Archive status changes from Running to Stopped.

21.) Return to the Explorer window. From the second Archive partition (Partition I: in Figure 8-14), copy the sub-directory **Data** into the first Archive partition (Partition E:)

22.) Shut down the system.

23.) Disconnect the adaptor's USB connector from the system.

24.) Disconnect the adaptor from the AC power supply.

25.) Carefully disconnect the PATA hard disk from the adaptor.

26.) Boot up the system to the regular scanning mode, then press <**Alt + P**>.

27.) From the View Menu, select **Explorer Bar > Folders**, as shown in Figure 8-17 below).

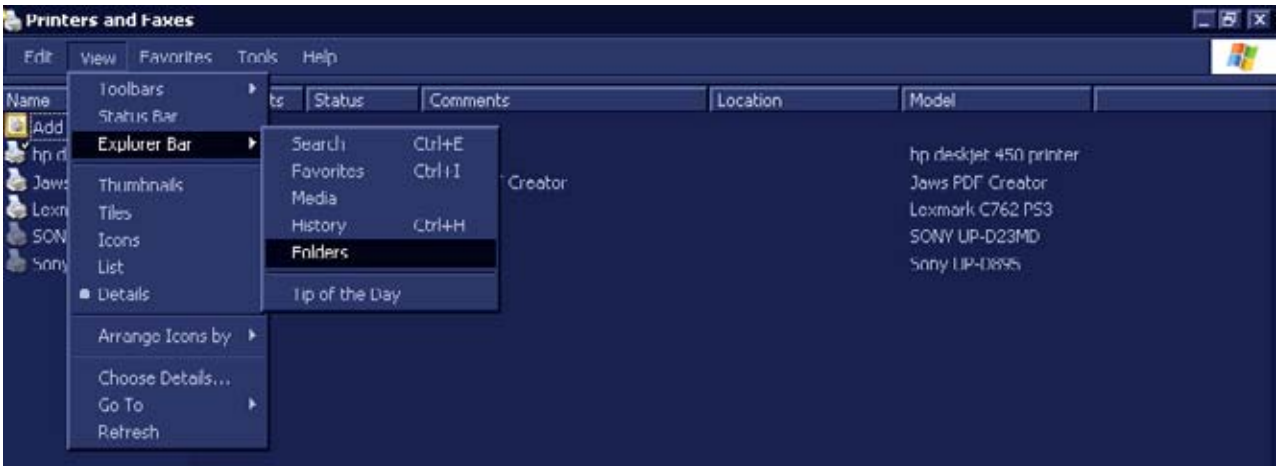

Figure 8-17 View Menu

The Desktop screen will be displayed, as shown in Figure 8-18 on page 8-14.

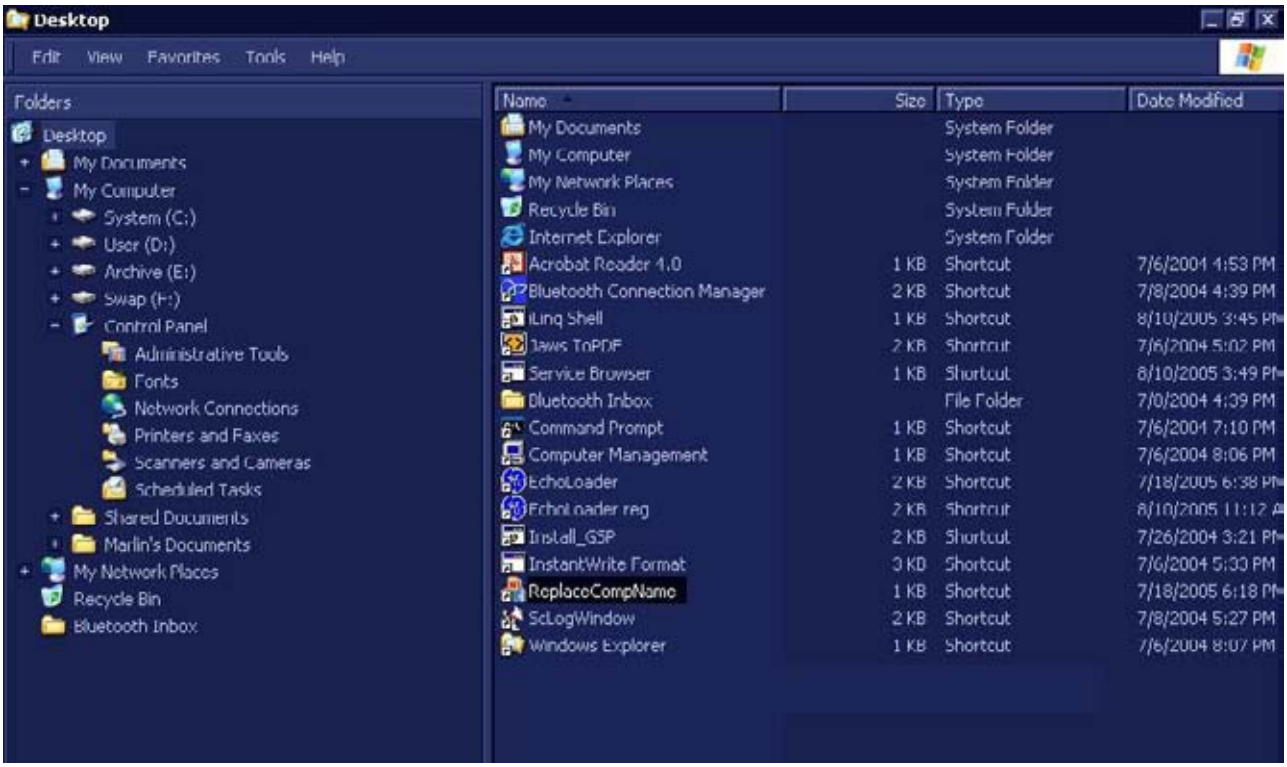
Desktop
Edit View Favorites Tools Help
Folders
Desktop
My Documents
My Computer
System (C:)
User (D:)
Archive (E:)
Swap (F:)
Control Panel
Administrative Tools
Fonts
Network Connections
Printers and Faxes
Scanners and Cameras
Scheduled Tasks
Shared Documents
Marlin's Documents
My Network Places
Recycle Bin
Bluetooth Inbox
Name Size Type Date Modified
My Documents System Folder
My Computer System Folder
My Network Places System Folder
Recycle Bin System Folder
Internet Explorer System Folder
Acrobat Reader 4.0 1 KB Shortcut 7/6/2004 4:53 PM
Bluetooth Connection Manager 2 KB Shortcut 7/8/2004 4:39 PM
iLinq Shell 1 KB Shortcut
Jaws ToPDF 2 KB Shortcut 7/6/2004 5:02 PM
Service Browser 1 KB Shortcut
Bluetooth Inbox File Folder 7/0/2004 4:39 PM
Command Prompt 1 KB Shortcut 7/6/2004 7:10 PM
Computer Management 1 KB Shortcut 7/6/2004 8:06 PM
EchoLoader 2 KB Shortcut
EchoLoader reg 2 KB Shortcut
Install_GSP 2 KB Shortcut 7/26/2004 3:21 PM
InstantWrite Format 3 KB Shortcut 7/6/2004 5:33 PM
ReplaceCompName 1 KB Shortcut 7/18/2005 6:18 PM
ScLogWindow 2 KB Shortcut 7/8/2004 5:27 PM
Windows Explorer 1 KB Shortcut

Figure 8-18 Desktop Screen

28.) Double-click the **ReplaceCompName** utility.

The IBUtil screen will be displayed, as shown in Figure 8-19 below.

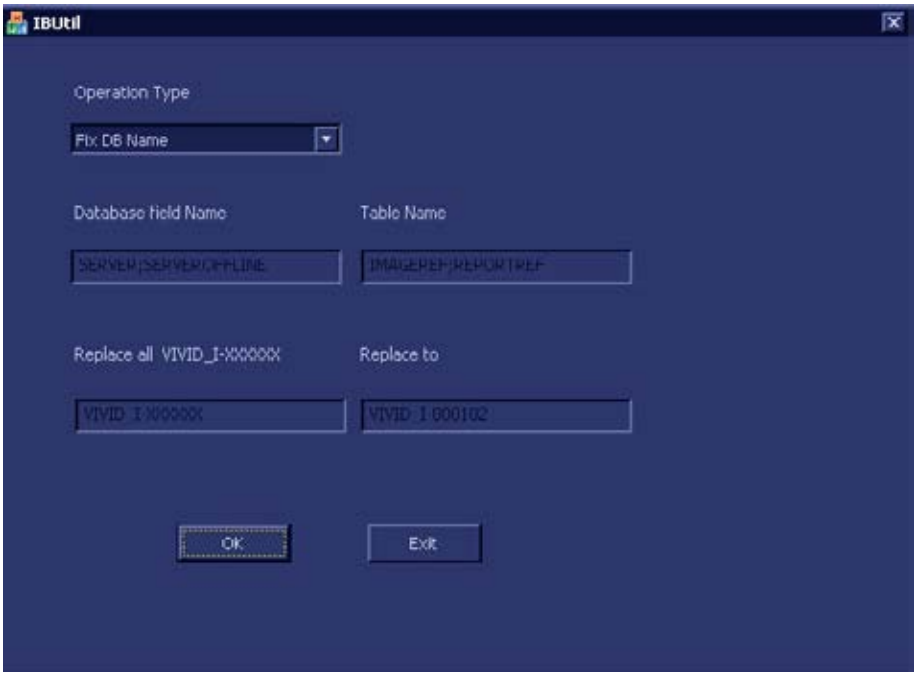

Figure 8-19 IBUtil Screen

*NOTE: By default, the Operation Type will be shown as **Fix DB Name**.*

29.) Click **OK**.

The following message is displayed:

30.) Click **OK** to close the message box.

NOTE: The DB links change according to the new system serial number to enable proper link functionality.

31.) Reboot the system (without the service dongle) into normal working mode.

32.) From the Patient List, select an “old” Exam and make sure the images are displayed (and have pointers to a Disk management device).

NOTE: If images are not displayed, do not proceed - contact OLC for assistance.

33.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

Connectivity Settings

IMPORTANT When restoring the Connectivity settings, it is necessary to perform the setup procedure through Advanced Settings.

It is also be necessary to refer to the connectivity settings noted in step 5 of the Preparation procedure (see Preparation on page 8 - 105) with regard to the following:

- TCP/IP address
- Network printer (if present)
- Wireless network settings (if present)

For step-by-step instructions, refer to Connectivity Configuration on page 3 - 105.

NOTE: All connectivity settings have to be configured with the co-operation of the local IT person.

Application Presets

Customer presets will remain as they were, since they are located in the original HDD. However the factory presets may be different if newer-version software has been installed.

8-2-4 Control Panel and Keyboard Replacement Procedure

8-2-4-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the following Control Panel and Keyboard (and sub-component) replacement procedures.

8-2-4-2 Time Required

10 minutes

8-2-4-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-4-4 Control Panel and Keyboard Removal Procedure

1) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
2) Place the Vivid-i™/Vivid-q™ portable ultrasound scanner face down and remove the battery as described in the Battery Removal Procedure on page 8 - 5.

NOTE: The following step may be viewed in the attached movie clip.

3) Loosen and remove each of the 9 screws that fasten the Control Panel and Keyboard onto the Bottom Assembly, as indicated in Figure 8-22 below.

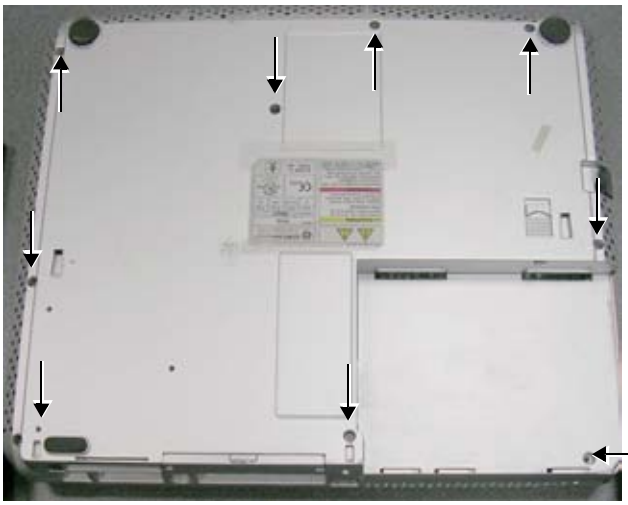

Figure 8-22 Removing the Fastening Screws from the Bottom Assembly

4.) Turn the Vivid-i™/ Vivid-q™ over, release the front latches and open the LCD Display cover.

NOTE: The following step may be viewed in the attached movie clip.

5) Carefully lift the Control Panel and Keyboard upwards from the front, then release it from the rear; remove it from the Vivid-i™/ Vivid-q™ and place it next to the system, as shown in Figure 8-23.

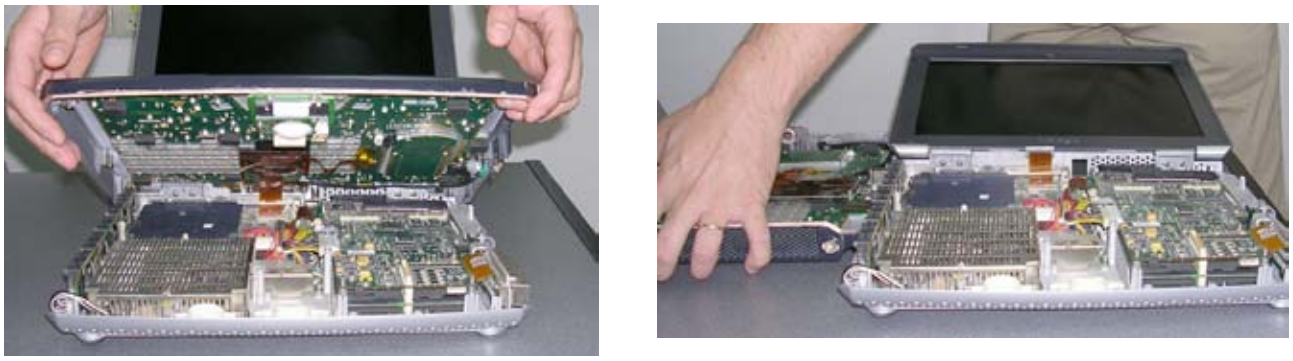

Figure 8-23 Removing the Control Panel and Keyboard

NOTE: The following step may be viewed in the attached movie clip.

NOTE: When removing the Control Panel and Keyboard during other replacement procedures, Step 6 will only be required if indicated.

6) Lift the Control Panel and Keyboard up to gain access to the cable connector underneath and disconnect the control panel/keyboard cable from the system as shown in Figure 8-24.

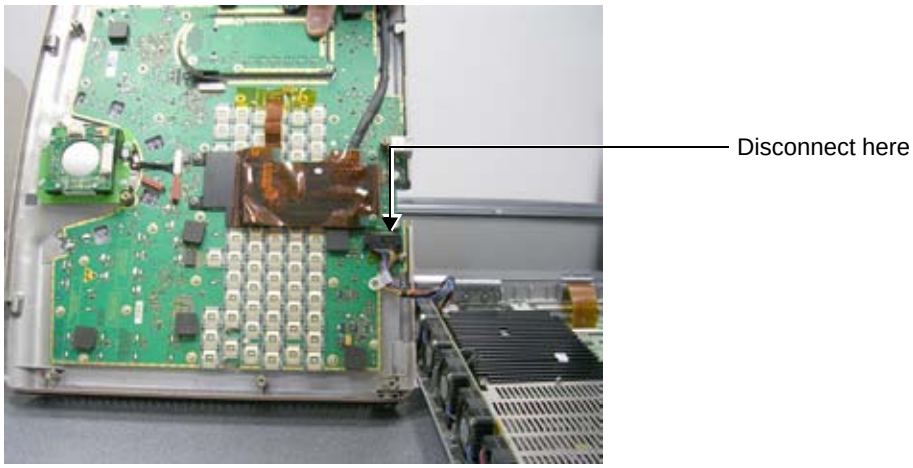

Figure 8-24 Disconnecting the Control Panel/Keyboard Cable

8-2-4-5 Control Panel and Keyboard Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the Control Panel and Keyboard Removal Procedure.

NOTE: When installing the Control Panel and Keyboard during other replacement procedures, Step 1 will only be required if indicated.

1) Stand the replacement Control Panel and Keyboard beside the Vivid-i™/ Vivid-q™ system and tilt it on its side to gain access to the cable connector underneath. Re-connect the keyboard/control panel cable from the system to the cable connector (refer to Figure 8-24, above).
2) Carefully lift the Control Panel and Keyboard into position on the Vivid-i™/ Vivid-q™ (refer to Figure 8-23, above). Make sure it is properly seated and take care to align the screw holes with those in the Bottom Assembly.
3.) Close the Vivid-i™/ Vivid-q™ LCD Display cover, making sure both front latches are securely fastened.
4.) Carefully turn the Vivid-i™/ Vivid-q™over, placing it face down.
5.) Return and fasten each of the 9 screws that secure the Control Panel and Keyboard onto the Bottom Assembly (refer to Figure 8-22, above).
6.) Re-install the battery as described in the Battery Installation Procedure on page 8 - 6.
7.) Return the Handle as described in the Bearing Handle Installation Procedure on page 8 - 4.
8) Reconnect the AC adapter and all cables to the Vivid-i™/Vivid-q™ portable ultrasound scanner.
9.) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
   - Chassis Current Leakage Test on page 10 - 24
   - Isolated Patient Lead (Source) Leakage – Lead-to-Ground on page 10 - 26
   - Isolated Patient Lead (Source) Leakage – Lead-to-Lead on page 10 - 27
   - Isolated Patient Lead (Sink) Leakage - Isolation Test on page 10 - 27
   - Alphanumeric Keyboard Test on page 4 - 19
   - External Keyboard Test on page 4 - 20
   - Trackball Test on page 4 - 22
   - Calibration Tests on page 7 - 25

8-2-4-5-1 Keycap Removal Procedure

NOTE: Replacement Keycaps for the Vivid-i™/ Vivid-q™ system are supplied as part of the Keycap Kit - Part No. S2423359. (For Scandinavian countries, Part No. 2420372-1).

1) Carefully place a small flat screw driver between the keycap you wish to remove and its neighboring keycap.
2) Use the screw driver to gently lever off the defective keycap, until it is completely loosened from its base (see Figure 8-25 below).
3.) Lift off and remove the defective keycap.

Figure 8-25 Keycap Replacement

8-2-4-5-2 Keycap Installation Procedure

1) Carefully place the appropriate new keycap in position on the keyboard, taking care to place the plastic alignment pin in the correct position so that the keycap is the right way up and reads correctly.
2) Gently push the keycap down until it snaps into position.

8-2-4-5-3 Trackball Removal Procedure

NOTE: This section describes the replacement procedure for Trackball Assembly - Part No. S2423360.

1) Lift the Control Panel and Keyboard up to gain access to the cable connector underneath and disconnect the keyboard/control panel cable from the system - refer to Figure 8-24 on page 8-17.

2) Tilt the Control Panel and Keyboard on its side and loosen and remove the four screws (two on either side of the bracket) that fasten the trackball assembly to the base of the Control Panel, as shown in Figure 8-26 below.

Figure 8-26 Trackball Removal

3.) Disconnect the three trackball cable connectors from the trackball assembly (carefully pull them out) and remove the trackball assembly from the Control Panel.

8-2-4-5-4 Trackball Installation Procedure

1) Return a new trackball assembly to the correct location on the Control Panel.

2) Carefully tilt the Control Panel and Keyboard on its side and return and fasten the four screws (two on either side of the bracket) to secure the trackball assembly to the base of the Control Panel (refer to Figure 8-26, above).

3) Re-connect the three trackball cable connectors (carefully push them in) to the trackball assembly.

8-2-4-5-5 ATGC Slider Keycap Removal Procedure

NOTE: This section describes the replacement procedure for ATGC Slider keycaps (supplied as part of the Keyboard Assembly) - Vivid-i™ systems: Part No. S423357; Vivid-q™ systems: Part No. S423358.

1) Carefully place a small flat screw driver between the ATGC slider keycap you wish to remove and the surface of the keyboard.
2) Use the screw driver to gently lever off the defective keycap, until it is completely loosened from its base.
3.) Lift off and remove the defective keycap - see Figure 8-27 below.

Figure 8-27 ATGC Slider Keycap Replacement

8-2-4-5-6 ATGC Slider Keycap Installation Procedure

1) Carefully place a new slider keycap in position on the slider base, taking care to place the plastic alignment pin in the correct location.
2) Gently push the slider keycap down until it snaps into position.

8-2-4-5-7 ATGC Rotary Knob Removal Procedure

NOTE: This section describes the replacement procedure for ATGC Rotary knob (supplied as part of the Keyboard Assembly) - Vivid-i™ systems: Part No. S423357; Vivid-q™ systems: Part No. S423358.

1) Carefully place a small flat screw driver between the ATGC Rotary knob and the surface of the keyboard - see Figure 8-25 below.
2) Use the screw driver to gently lever off the defective rotary knob, until it is completely loosened from its base.

3.) Lift off and remove the defective knob - see Figure 8-28 below.

Figure 8-28 ATGC Rotary Knob Replacement

8-2-4-5-8 ATGC Rotary Knob Installation Procedure

1) Carefully place a new ATGC Rotary Knob in position on the keyboard, taking care to place the plastic alignment pin in the correct location.
2) Gently push the ATGC Rotary Knob down until it snaps into position.

8-2-4-5-9 ECG/Respiratory Module Assembly Removal Procedure

NOTE: For Vivid-i™/ Vivid-q™ systems that previously did not have the Respiratory Option, it is necessary remove the ECG Board from the ECG Module Assembly and replace it with an ECG/Respiratory Board. The removal procedure below describes the required steps.

1) Lift the Control Panel and Keyboard up to gain access to the cable connector underneath and disconnect the keyboard/control panel cable from the system - refer to Figure 8-24 on page 8-17.

2) Loosen and remove the four hex nuts (two on either side of the bracket) that fasten the ECG Module assembly to the base of the Control Panel, as shown in Figure 8-26, above.

Figure 8-29 ECG Module Assembly Removal

3) Lift and tilt the ECG Module on its side, then disconnect the ECG Module cable - see Figure 8-30 on page 8-24.

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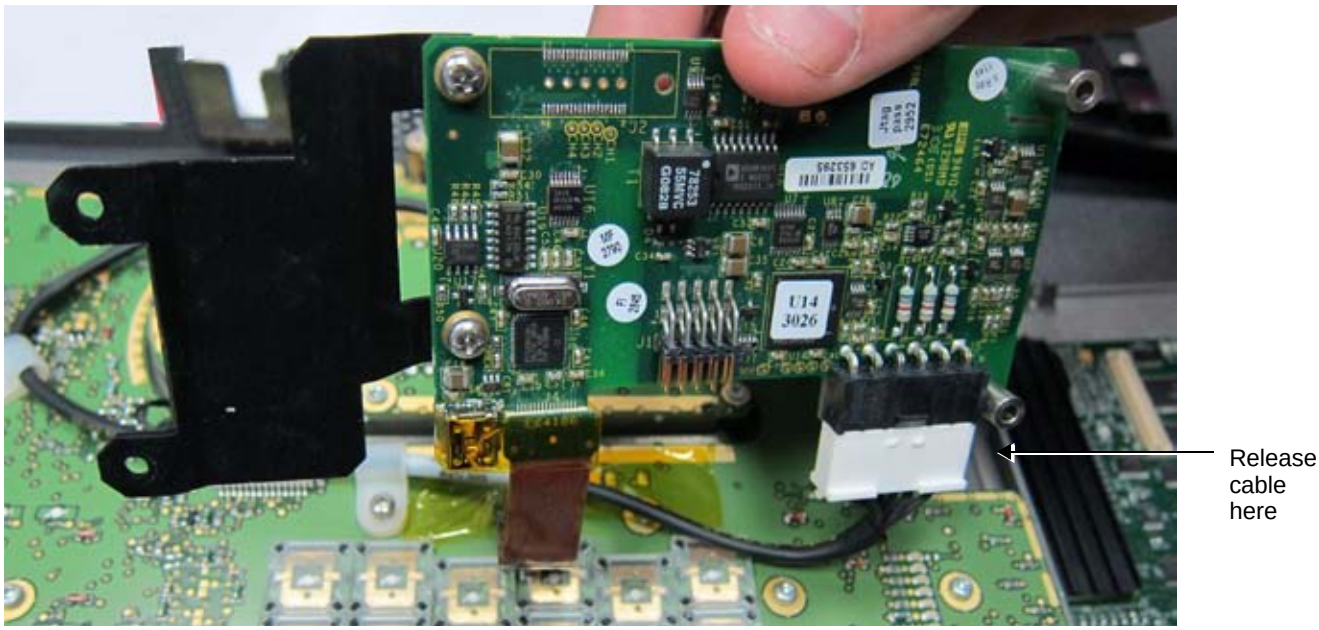


Figure 8-30 Disconnecting the ECG Module Cable

4.) Carefully remove the ECG module assembly (board and bracket) from the base of the Control Panel and place it on a table.

5.) Unfasten the two screws that secure the bracket to the ECG Board and remove the bracket.

6.) Fit the bracket to the new ECG/Respiratory Board, ready for the installation procedure.

8-2-4-5-10 ECG/Respiratory Module Assembly Installation Procedure

1) Carefully tilt the Control Panel and Keyboard on its side.

2) Position a new ECG/Respiratory Module assembly in the correct location on the base of the Control Panel.

3) Re-connect the ECG cable - see Figure 8-30, above.

4) Return and fasten the four hex nuts (two on either side of the bracket) to secure the ECG/Respiratory Module assembly to the base of the Control Panel (refer to Figure 8-29 on page 8-23).

5.) Install the Control Panel and Keyboard, as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.

6.) Turn ON power to the system.

The system re-boots into Normal Scanning mode.

7.) Press **Config** and log on as Adm - see Log On to the System as ADM on page 4 - 11.

8.) Selet **About**, then activate the **HwVersion** tab.

9.) Verify that the correct ECG/Respiratory module Part # is displayed, as shown in Figure 8-31.

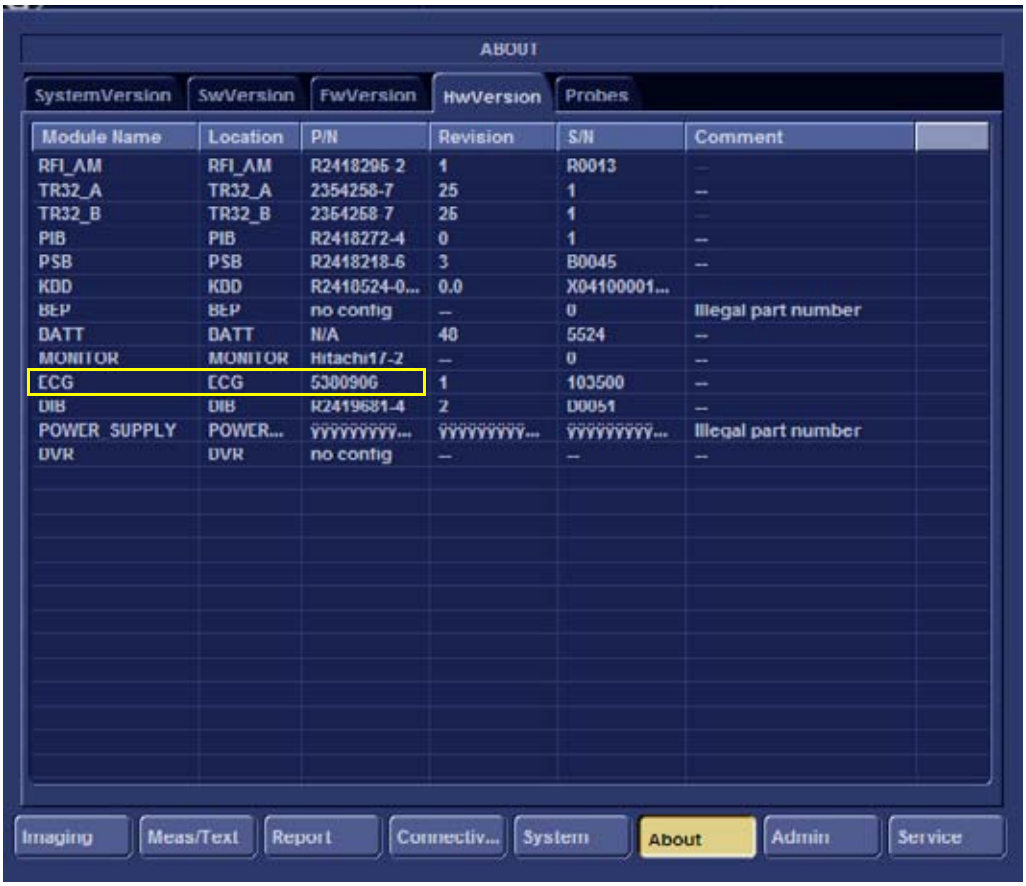


Figure 8-31 Hardware Version Verification

10.) Proceed to perform the following functionality tests:

- Isolated Patient Lead (Source) Leakage – Lead-to-Ground on page 10 - 26
- Isolated Patient Lead (Source) Leakage – Lead-to-Lead on page 10 - 27
- Isolated Patient Lead (Sink) Leakage - Isolation Test on page 10 - 27
- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- ECG/Respiratory Test on page 4 - 26

8-2-5 Rear Cover & Latch Assembly Replacement Procedure

NOTE: This section describes the replacement procedure for Rear Cover & Latch Assembly - supplied as part of the Cover Kit (Vivid-i™ systems Part No. S2423361; Vivid-q™ systems Part No. S2423362).

8-2-5-1 Tools

None required.

8-2-5-2 Time Required

30 minutes

8-2-5-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-5-4 Rear Cover & Latch Assembly Removal Procedure

1) Disconnect the AC adapter and all cables from the Vivid-i™/Vivid-q™ portable ultrasound scanner.
2) Remove the Bearing Handle as described in the Bearing Handle Removal Procedure on page 8 - 3.
3) Remove the Control Panel and Keyboard as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
4) Remove the LCD Display Frame as described in the LCD Display Frame Removal Procedure on page 8 - 34.
5) Remove the Microphone Assembly as described in the Microphone Assembly Removal Procedure on page 8 - 68.
6) Remove the LCD Display; see the LCD Display Removal Procedure on page 8 - 60.
7.) Loosen and remove the two screws on each of the *left* and *right* hinges (attached to the Rear Cover and Latch Assembly), as shown in Figure 8-32 below.

Figure 8-32 Removing the Hinge Screws

8.) Lift the Rear Cover and Latch Assembly away from the Bottom Assembly and remove completely from the system.

8-2-5-5 Rear Cover & Latch Assembly Installation Procedure

1.) Return the Rear Cover and Latch Assembly to the system and place it in position on the Bottom Assembly, carefully checking that the *left* and *right* hinges are properly aligned.
2.) Return and fasten the two screws on each of the *left* and *right* hinges (previously removed - refer to Figure 8-32).
3) Return the LCD Display; see the LCD Display Installation Procedure on page 8 - 62.
4) Return the Microphone Assembly as described in the Microphone Assembly Installation Procedure on page 8 - 69.
5) Return the LCD Display Frame as described in the LCD Display Frame Installation Procedure on page 8 - 35.

6) Return the Control Panel and Keyboard as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.

7) Return the Bearing Handle as described in the Bearing Handle Installation Procedure on page 8 - 4.

8) Reconnect the AC adapter and all cables to the Vivid-i™/Vivid-q™ portable ultrasound scanner.

9.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Microphone Test on page 4 - 24
- Full System Test on page 7 - 10

8-2-6 LCD Display Cover Hinges Replacement Procedure

*NOTE: This section describes the replacement procedure for the LCD Display Cover hinges **only** (Part No. S2381805-2; one pair of hinges).*

8-2-6-1 Tools

Phillips screwdriver

8-2-6-2 Time Required

30 minutes

8-2-6-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-6-4 LCD Display Cover Removal Procedure

1.) Remove the Control Panel and Keyboard, as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.

NOTE: The following step may be viewed in the attached movie clip.

2.) Disconnect the LCD Flex ribbon cable from the BEP, as shown in Figure 8-33.
Use a flat screwdriver to carefully release the cable from the connector.

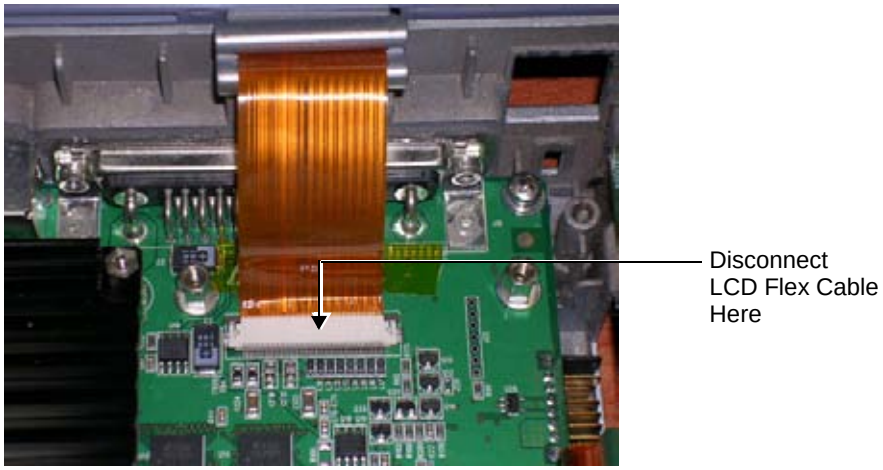


Figure 8-33 LCD Flex Cable Connected to BEP

3.) Loosen and remove the 2 screws from each of the LCD hinges, as shown in Figure 8-34.

Figure 8-34 LCD Display Hinges Secured to Base Assembly - Location of Screws

4.) Remove the LCD Display Frame, as described in the LCD Display Frame Removal Procedure on page 8 - 34.

5.) Loosen and remove the 2 screws that secure the *left* hinge to the LCD Display cover (Figure 8-35), then carefully remove the hinge.

6.) Loosen and remove the 2 screws that secure the *right* hinge to the LCD Display cover (Figure 8-35), then carefully remove the hinge.

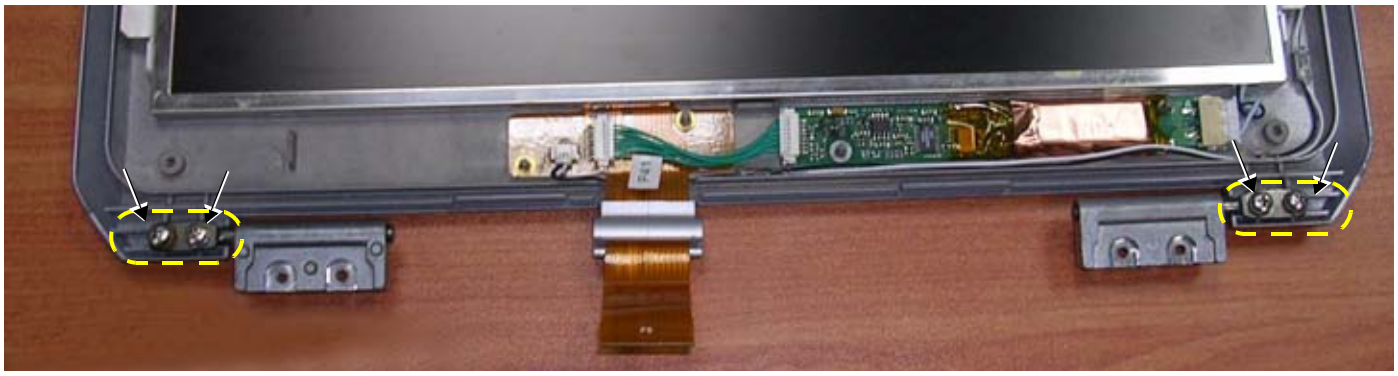


Figure 8-35 Hinges Secured to LCD Display Cover - Location of Screws

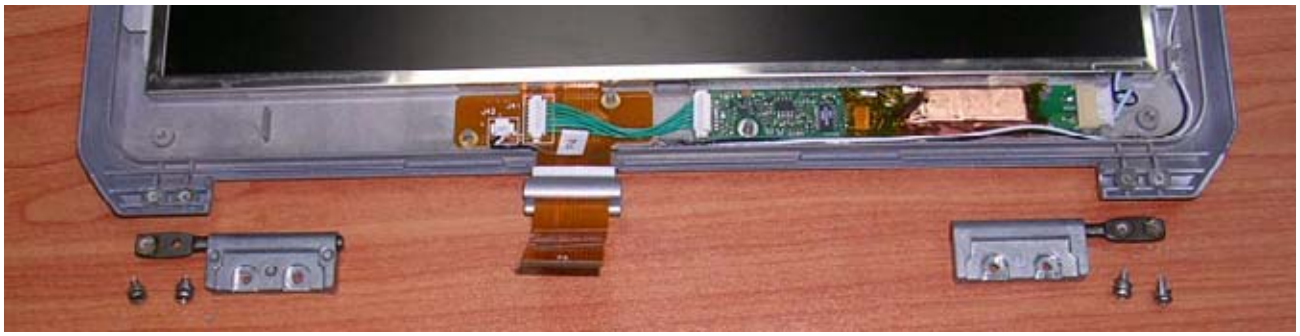


Figure 8-36 Hinges Removed from LCD Display Cover

8-2-6-5 LCD Display Cover Installation Procedure

1.) Carefully place a replacement hinge in the correct position on the *right* side of the LCD Display cover (refer to Figure 8-35 on page 8-29). Return and fasten the 2 screws (previously removed) making sure the hinge is properly secured. *Do not over-tighten the screws*.

2.) Carefully place a replacement hinge in the correct position on the *left* side of the LCD Display cover (refer to Figure 8-35). Return and fasten the 2 screws (previously removed) making sure the hinge is properly secured. *Do not over-tighten the screws*.

3.) Refit the LCD Display Frame, as described in the LCD Display Frame Installation Procedure on page 8 - 35.

4.) Return and fasten the 2 screws (previously removed) to each of the LCD hinges, making sure each hinge is securely fastened to the Base Assembly - refer to Figure 8-34 on page 8-29.
Do not over-tighten the screws.

5.) Reconnect the LCD flex cable to the BEP (refer to Figure 8-33 on page 8-28).

6.) Refit the Control Panel and Keyboard, as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.

7.) Close and open the lid a few times to ensure proper closure of the LCD Display cover.

8) Reconnect the AC adapter and all cables to the Vivid-i™/Vivid-q™ portable ultrasound scanner.

9.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24

8-2-7 Bottom Assembly Replacement Procedure

8-2-7-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the bottom assembly replacement procedures.

8-2-7-2 Time Required

30 minutes

8-2-7-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-7-4 Bottom Assembly Removal Procedure

1) Remove the battery as described in the Battery Removal Procedure on page 8 - 5.
2) Remove the bearing handle as described in the Bearing Handle Removal Procedure on page 8 - 3.
3) Remove the hard disk as described in the Hard Disk Removal Procedure on page 8 - 7.
4) Remove the Control Panel and Keyboard as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
5) Remove the P&M Board as described in the P&M (Probe and MUX) Board Removal Procedure on page 8 - 37.
6) Remove the TR32 and RFI Boards as described in the TR32 and RFI Boards Removal Procedure on page 8 - 39.
7) Remove the BEP as described in the BEP Removal Procedure on page 8 - 45.
8) Remove the HVPS as described in the HVPS Removal Procedure on page 8 - 53.
9) Remove the fans as described in the Fan Removal Procedure on page 8 - 56.
10) Remove the LCD Display Frame as described in the LCD Display Frame Removal Procedure on page 8 - 34.
11.) Separate the Bottom Assembly from the LCD Display rear cover by loosening and removing the two screws on each of the *left* and *right* hinges (attached to the Rear Cover and Latch Assembly). Refer to Figure 8-32 on page 8-26.
12.) Remove the Bottom Assembly from the system.
13.) Remove the *Vivid-i™/ Vivid-q™ system label from the base of the defective Bottom Assembly (peel off), ready to use on the replacement Bottom Assembly.*

8-2-7-5 Bottom Assembly Installation Procedure

1) *Adhere the Vivid-i™/ Vivid-q™ system label (previously removed in step 13 above) to the base of the replacement unit*.
2.) Return the new Bottom Assembly to the system.
3.) Attach the LCD Display rear cover to the Bottom Assembly, carefully aligning the *left* and *right* hinges (attached to the Rear Cover and Latch Assembly) and returning and fastening the two screws on each side, as shown in Figure 8-32 on page 8-26.

Note: ***Do not overtighten the screws*.**

4.) Return the LCD Frame as described in the LCD Display Frame Installation Procedure on page 8 - 35
5) Return the fans as described in the Fan Installation Procedure on page 8 - 58.

6) Return the HVPS as described in the HVPS Installation Procedure on page 8 - 55.

7) Return the BEP as described in the BEP Installation Procedure on page 8 - 49.

8) Return the TR32 and RFI Boards as described in the TR32 and RFI Boards Installation Procedure on page 8 - 44.

9) Return the P&M Board as described in the P&M (Probe and MUX) Board Installation Procedure on page 8 - 38.

10) Return the Control Panel and Keyboard as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.

11) Return the hard disk as described in the Hard Disk Installation Procedure on page 8 - 8.

12) Return the bearing handle as described in the Bearing Handle Installation Procedure on page 8 - 4.

13.) Re-install the battery as described in the Battery Installation Procedure on page 8 - 6.

14.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-2-8 LCD Display Frame Replacement Procedure

8-2-8-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the bottom assembly replacement procedures.

8-2-8-2 Time Required

10 minutes

8-2-8-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-2-8-4 LCD Display Frame Removal Procedure

NOTE: The following step may be viewed in the attached movie clip.

1) With the LCD Display in the open (upright) position, use a flat screwdriver to remove the screw cap from each of the four screws that fasten the LCD display frame in position, as shown in Figure 8-37 below.

Figure 8-37 Removing the Screw Caps from the LCD Display Frame

NOTE: The following step may be viewed in the attached movie clip.

2) Loosen and remove the four screws (Figure 8-38).

Figure 8-38 Removing the Securing Screws

NOTE: The following step may be viewed in the attached movie clip.

3) With the LCD Display in the fully open position, carefully release the LCD display frame from the securing clips on all four sides, using both hands to release and lift it away from the LCD display.

Figure 8-39 Removing the LCD Display Frame

8-2-8-5 LCD Display Frame Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the LCD Display Frame Removal Procedure.

1) With the LCD Display in the fully open position, return the LCD display frame to the correct position and using both hands, press the frame under the securing clips on all four sides to fasten it against the LCD display. Refer to Figure 8-39 on page 8-35.

2) Return and tighten the four screws (previously removed).

3) With the LCD Display in the open (upright) position, return the screw cap to each of the four screws that fasten the LCD frame in position, as shown in Figure 8-37 on page 8-34.

4.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24

Section 8-3
Internal Component Replacement Procedures

NOTE: When performing Internal Component Replacement Procedures, generally it is not necessary to disconnect and completely remove the Control Panel and Keyboard from the system. Simply remove it from the Bottom Assembly and lay it next to the Vivid-i™/Vivid-q™ portable ultrasound scanner, as shown in Figure 8-23 on page 8-17.

*NOTE: When tightening screws, **do not overtighten or use excessive force**.*

CAUTION: DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:

1.ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP, TO THE ADVISED ESD CONNECTION POINT LOCATED ON THE REAR OF THE SCANNER (TO THE RIGHT OF THE POWER CONNECTOR).

2.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

8-3-1 P&M (Probe and MUX) Board Replacement Procedure

8-3-1-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the bottom assembly replacement procedures.

8-3-1-2 Time Required

15 minutes

8-3-1-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-1-4 P&M (Probe and MUX) Board Removal Procedure

1) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
2) Remove the Control Panel and Keyboard, as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
3) Loosen and remove the four screws that secure the P&M Board to the RFI Board, as shown in Figure 8-40.

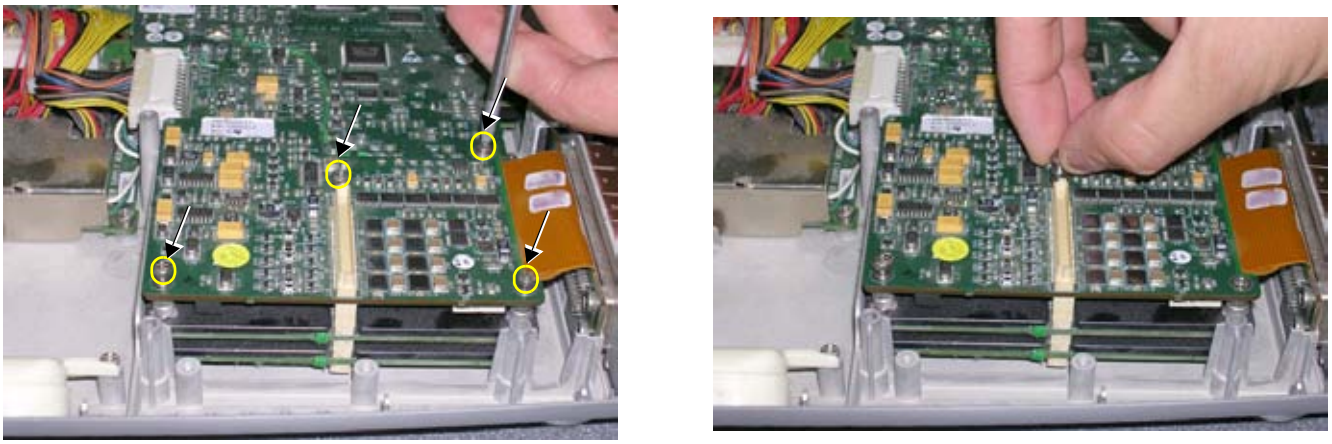


Figure 8-40 Removing the Screws that Secure the P&M Board to the RFI Board

NOTE: The following steps may be viewed in the attached movie clip.

4.) Loosen the two screws that fasten the P&M Board to the Bottom Assembly, as shown in Figure 8-41 below.

Figure 8-41 Loosening the Screws from the P&M Board

5.) Lift the P&M Board *upwards* away from the Bottom Assembly and remove it completely, as shown in Figure 8-42 below.

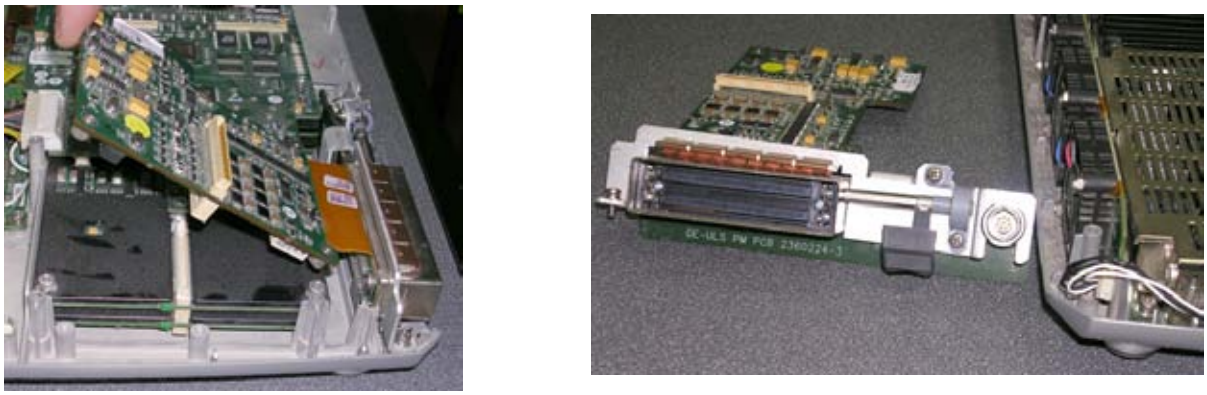


Figure 8-42 Removing the Probe and MUX Board from the Bottom Assembly

8-3-1-5 P&M (Probe and MUX) Board Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the P&M (Probe and MUX) Board Removal Procedure.

CAUTION: When installing boards, ESD may cause damage to a board. Always have the ESD hand strip connected to the machine chassis and to your hand.

1) Return a new P&M Board to the system, pushing it *downwards* into position on the Bottom Assembly. Make sure it is properly seated before returning and fastening the two screws (previously removed). Refer to Figure 8-42 and Figure 8-41, above.

2.) Return and fasten the four screws to secure the P&M Board to the RFI Board, as shown in Figure 8-40 on page 8-37.

3.) Return the Control Panel and Keyboard, as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18

4.) Return the bearing handle, as described in the Bearing Handle Installation Procedure on page 8 - 4.

5.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-3-2 TR32 and RFI Boards Replacement Procedure

*NOTE: When replacing the TR32 Boards, both boards must be of the **same version**. Always verify this by examining the version number stated on the board, as shown in Figure 8-43, below.*

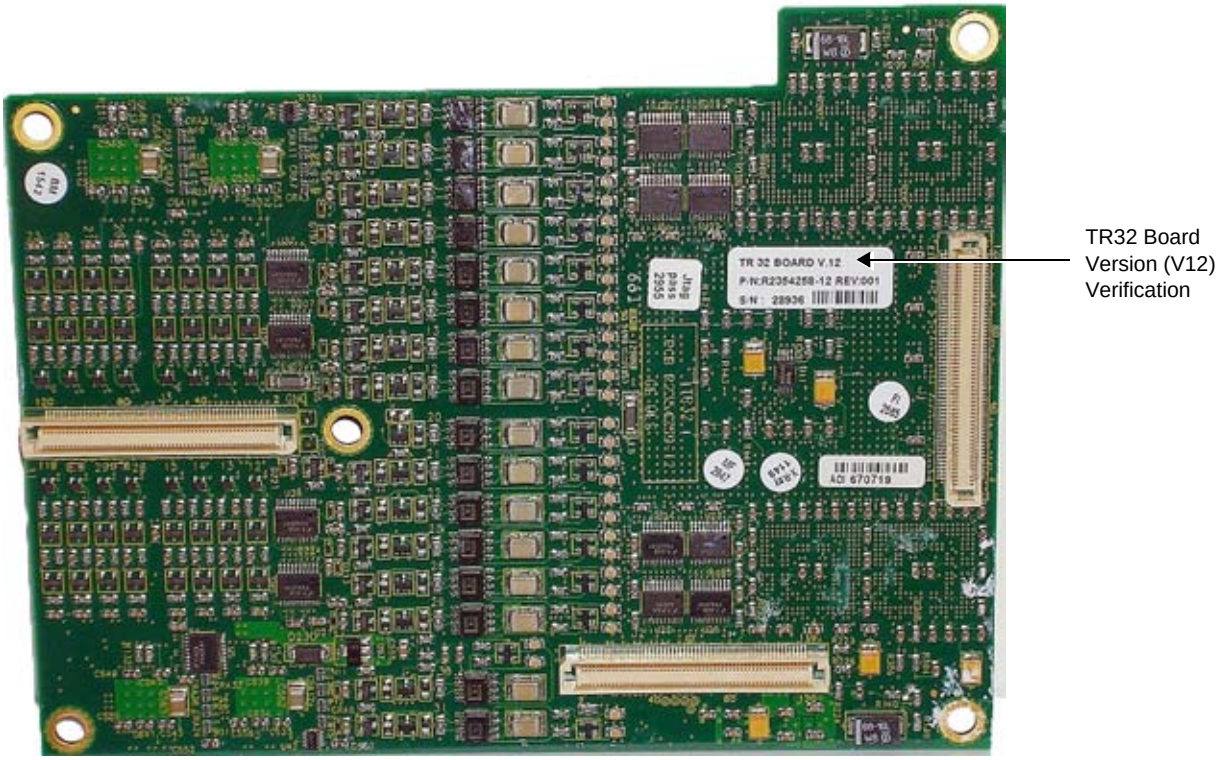


Figure 8-43 TR32 Board Verification (Version 12)

CAUTION: When removing the boards, ESD may cause damage to a board. Always have the ESD hand strip connected to the machine chassis and to your hand.

8-3-2-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the bottom assembly replacement procedures.

8-3-2-2 Time Required

15 minutes

8-3-2-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-2-4 TR32 and RFI Boards Removal Procedure

1) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
2) Remove the Control Panel and Keyboard, as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.

NOTE: The following step may be viewed in the attached movie clip.

3) Loosen the eight screws that secure the TR32 and RFI Boards to the Bottom Assembly, as shown in Figure 8-44 below.

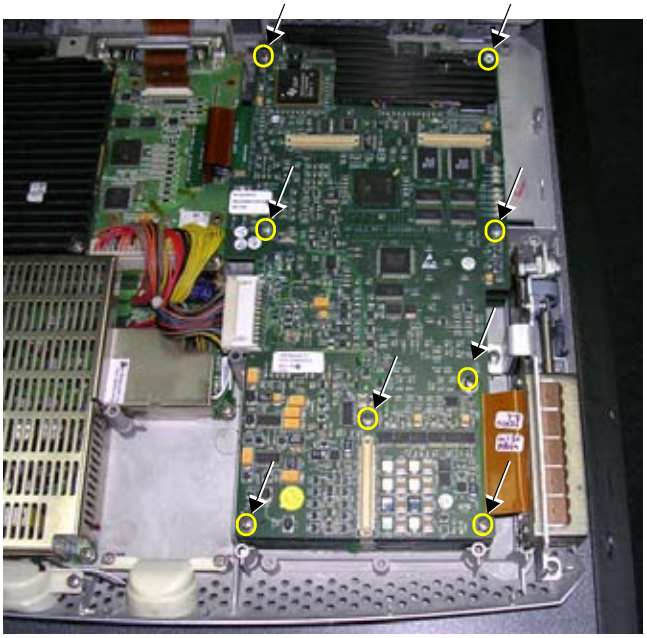


Figure 8-44 Loosen Screws that Secure TR32 and RFI Boards to Bottom Assembly

NOTE: The following step may be viewed in the attached movie clip.

4) Remove the eight screws - see Figure 8-45.

Figure 8-45 Removing the Screws

NOTE: The following step may be viewed in the attached movie clip.

5) Disconnect the PCI cable flex (BEP-to-RFI) from the cable connector on RFI Board as shown in Figure 8-46 below.

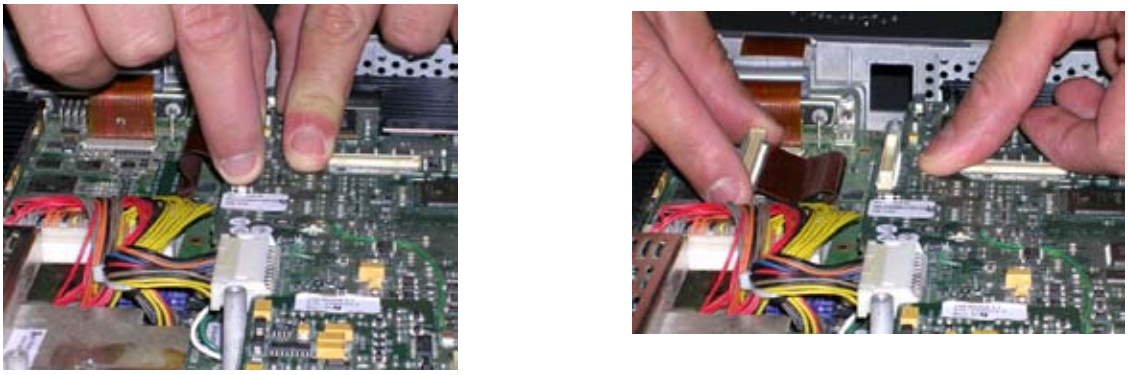


Figure 8-46 Disconnecting the PCI Cable from the RFI Board

NOTE: The following step may be viewed in the attached movie clip.

6) Disconnect each of the two HVPS cables from their sockets on DC Power Supply, as shown in Figure 8-47 below.

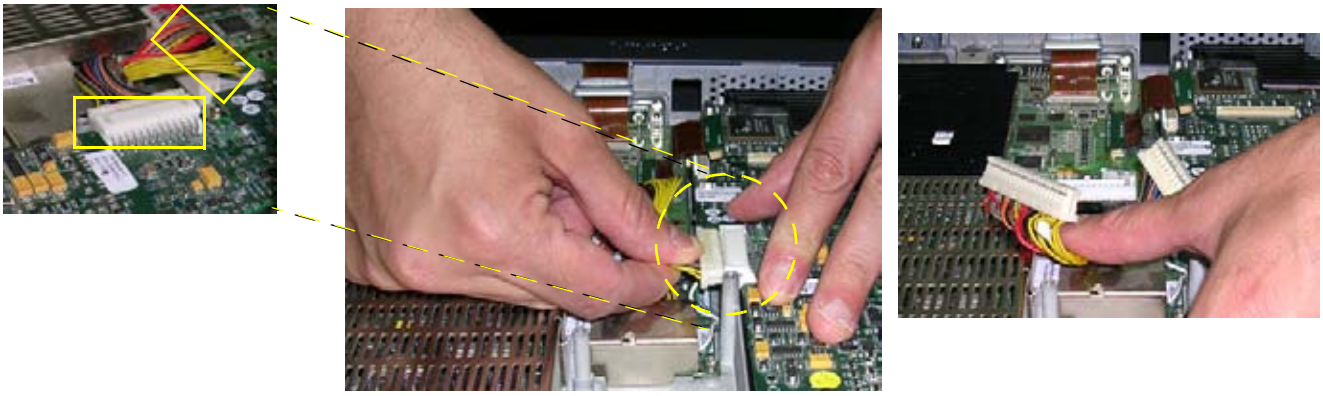


Figure 8-47 Disconnecting the DC Power Supply

NOTE: The following steps may be viewed in the attached movie clip.

7) Gently lift one side of the P&M Board upwards and hinge it open to gain access to the RFI and TR32 Board assembly beneath, as shown in Figure 8-49 below.
(The RFI and TR32 Boards are seated together in the system as one unit).

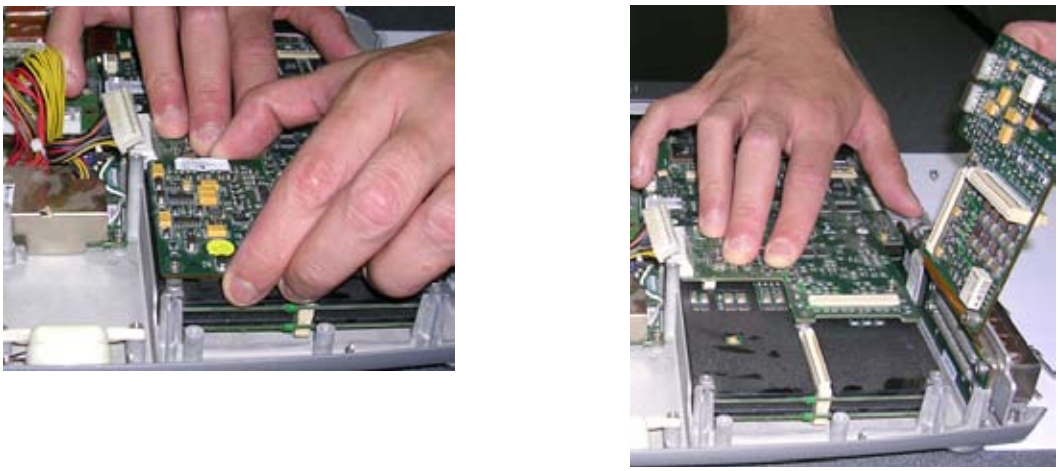


Figure 8-48 Accessing the RFI and TR32 Boards

8) Lift the RFI and TR32 Board assembly upwards and remove it from the Bottom Assembly, as shown in Figure 8-49 below

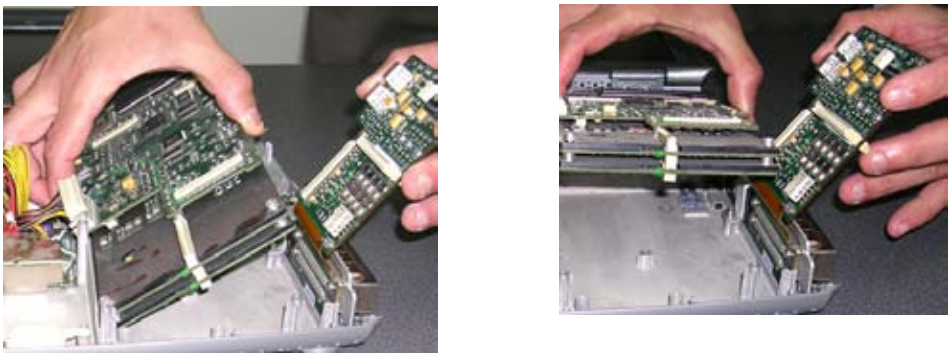


Figure 8-49 Removing the RFI and TR32 Boards from the Bottom Assembly

NOTE: The following steps may be viewed in the attached movie clip.

9.) Remove the RFI Board from the TR32 Boards (separate by gently pulling them apart), as shown in Figure 8-50 below.

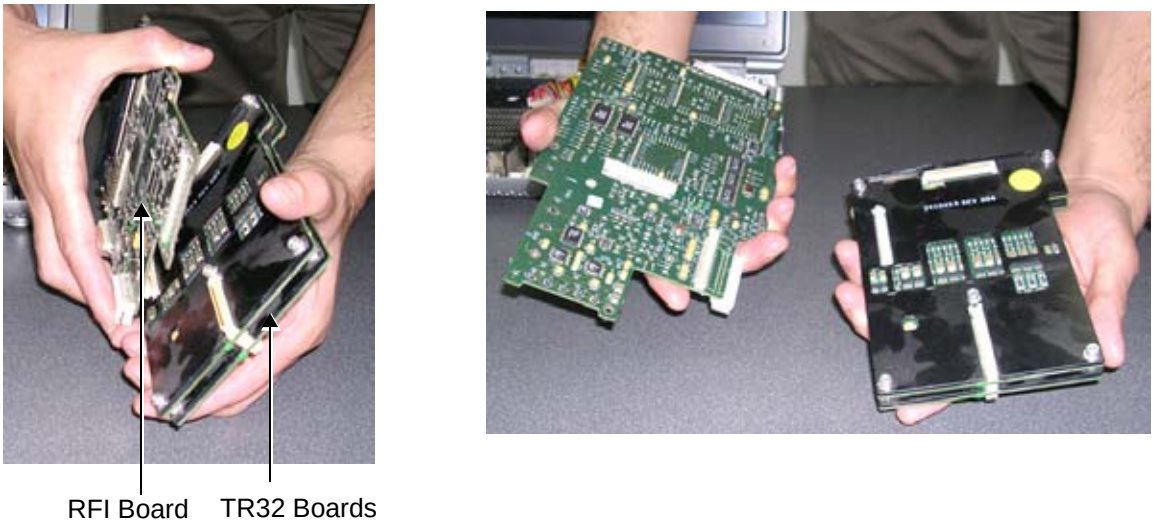


Figure 8-50 Removing the RFI Board from the TR32 Boards

10.) Separate the two TR32 Boards from each other, as shown in Figure 8-51 below.

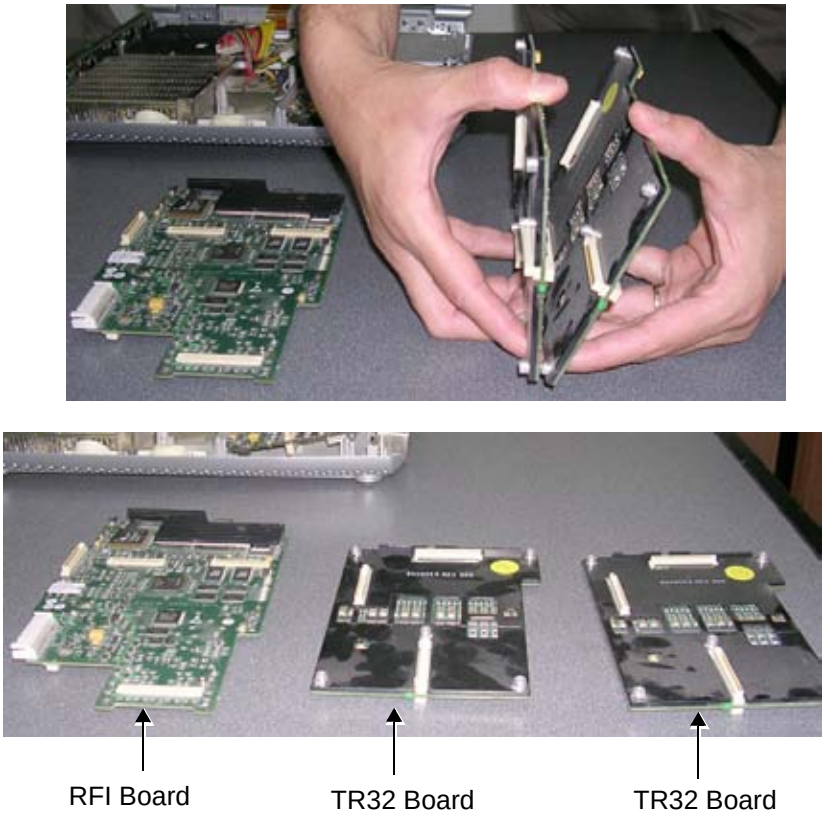


Figure 8-51 Separating the Two TR32 Boards from Each Other

Note: Replace the defective board, as described in the appropriate steps of the following procedure.

8-3-2-5 TR32 and RFI Boards Installation Procedure

NOTE: This procedure applies to replacement of one or more of the defective boards (TR32A and/or, TR32B and/or RFI).

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the TR32 and RFI Boards Removal Procedure.

CAUTION: When installing boards, ESD may cause damage to a board. Always have the ESD hand strip connected to the machine chassis and to your hand.

1) Re-connect the two TR32 Boards to each other (gently press together as shown in Figure 8-51 on page 8-43).
2) Connect the TR32 Boards to the RFI Board (gently press together as shown in Figure 8-50 on page 8-43).
3) Return the TR32 and RFI Board assembly to the system, placing it in position on the Bottom Assembly. (While performing this step, gently lift one side of the P&M Board upwards and hinge it open in order to insert the TR32 and RFI Board assembly underneath). Refer to Figure 8-48 and Figure 8-49 on page 8-42.
4.) Reconnect each of the two HVPS cables to the DC Power Supply (see Figure 8-47 on page 8-41).
5.) Reconnect the PCI cable flex (BEP-to-RFI) to the cable connector on RFI Board (see Figure 8-46 on page 8-41).
6.) Return the eight screws and fasten the TR32 and RFI Board assembly firmly in position on the Bottom Assembly (refer to Figure 8-44 and Figure 8-45 on page 8-40).
7) Return the Control Panel and Keyboard to its original position, as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.
8) Return the bearing handle, as described in the Bearing Handle Installation Procedure on page 8 - 4.
9.) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
   - Chassis Current Leakage Test on page 10 - 24
   - Calibration Tests on page 7 - 25
   - Full System Test on page 7 - 10

8-3-3 BEP Replacement Procedure

CAUTION: BEFORE REPLACING THE BEP, REMEMBER TO PERFORM A FULL INCREMENTAL BACK-UP OF THE ARCHIVE AND USER PRESETS.
For details, refer to Vivid-i™ Software Upgrade from Version BT10 to BT11 on page 8 - 103 *and Preparation* on page 8 - 105.

8-3-3-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the BEP replacement procedures.

8-3-3-2 Time Required

15 minutes

8-3-3-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-3-4 BEP Removal Procedure

1) Disconnect any peripherals currently connected to the system and make sure there is no T-plug (dongle) or any other peripheral connected to the USB or PCMCIA.
2) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
3) Make sure the Vivid-i™/ Vivid-q™ LCD Display cover is securely closed and place the scanner face down. Remove the battery as described in the Battery Removal Procedure on page 8 - 5.
4) Remove the Hard Disk, as described in the Hard Disk Removal Procedure on page 8 - 7.
5.) Loosen and remove the two securing nuts (one on each side of the VGA Connector, located on the Vivid-i™/ Vivid-q™ rear panel), as shown Figure 8-52.

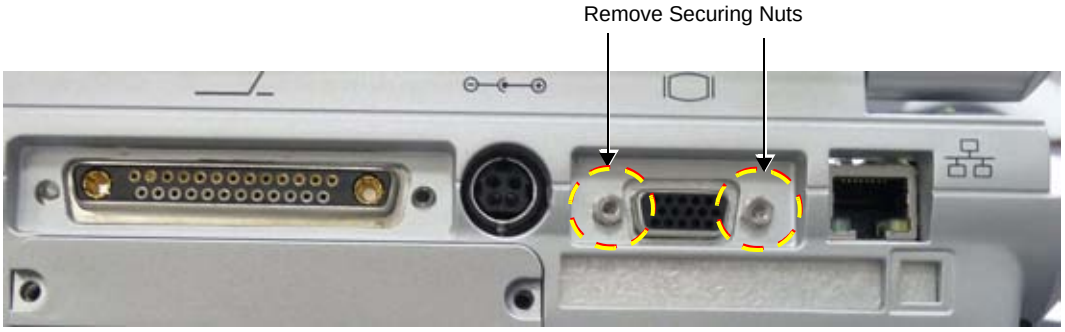


Figure 8-52 Vivid-i™/ Vivid-q™ Scanner - Rear View

6) Remove the Control Panel and Keyboard, as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
7) Disconnect all the cables from the BEP.

Note: When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

Proceed as follows:

Disconnect BEP cables as follows (refer to Figure 8-53 below):

a.) Disconnect the LCD Flex ribbon cable (carefully pull back the two connector latches to release).

b.) Disconnect the BEP-to-RFI Flex cable.

c.) Disconnect the HVPS-to-BEP power cable.

d.) Disconnect the Fan/Speaker-to-BEP power cable.

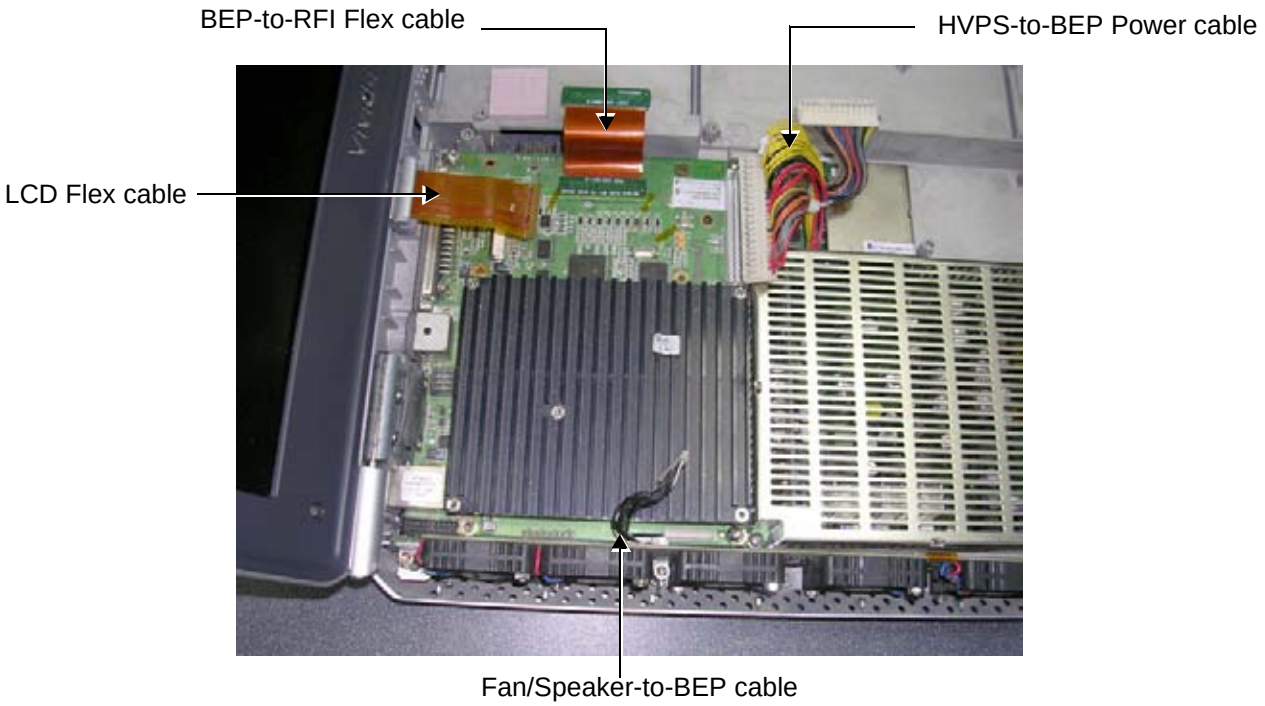


Figure 8-53 Disconnecting Cables from the BEP

NOTE: The following step may be viewed in the attached movie clip.

8) Unscrew and remove the four screws that secure the BEP to the Bottom Assembly as shown in Figure 8-65 below.

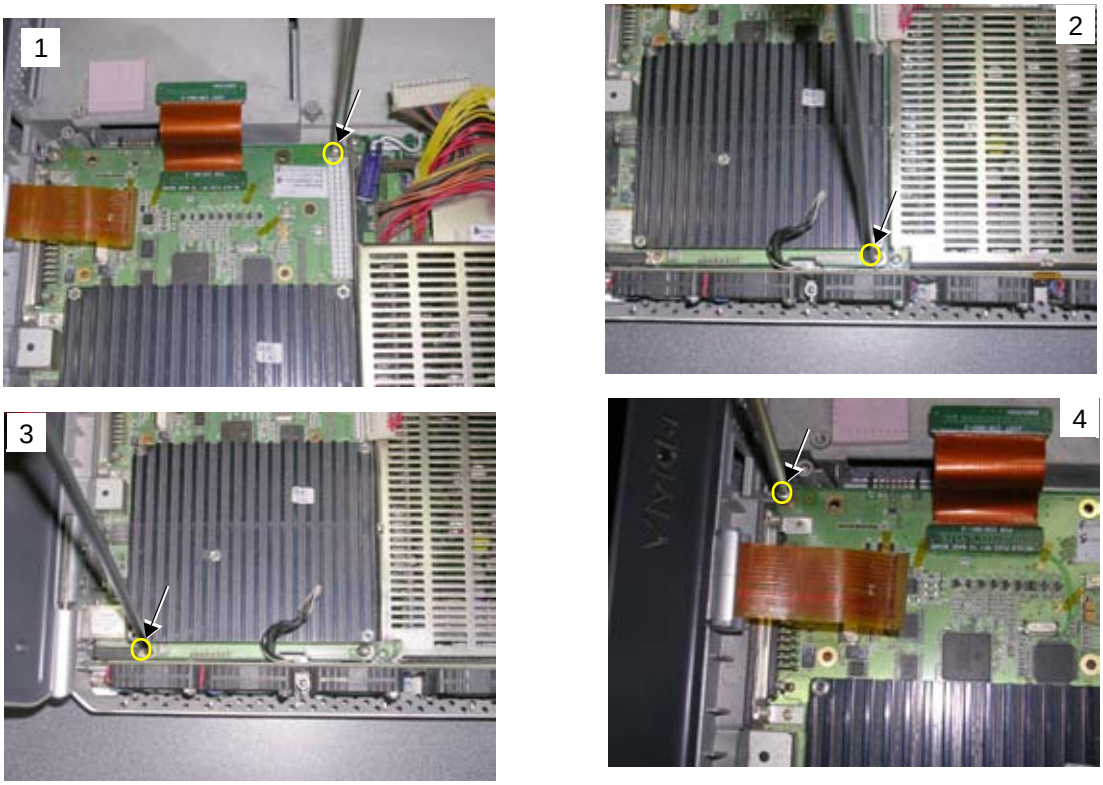


Figure 8-54 Removing the Screws from the BEP

NOTE: Beneath one of the four screws removed in the previous step, is a small plastic securing tab (illustrated in Figure 8-55) that serves to seat the BEP firmly in position. It is necessary to loosen and release this tab (lift it up using a screw driver if necessary) in order to facilitate complete removal of the BEP.

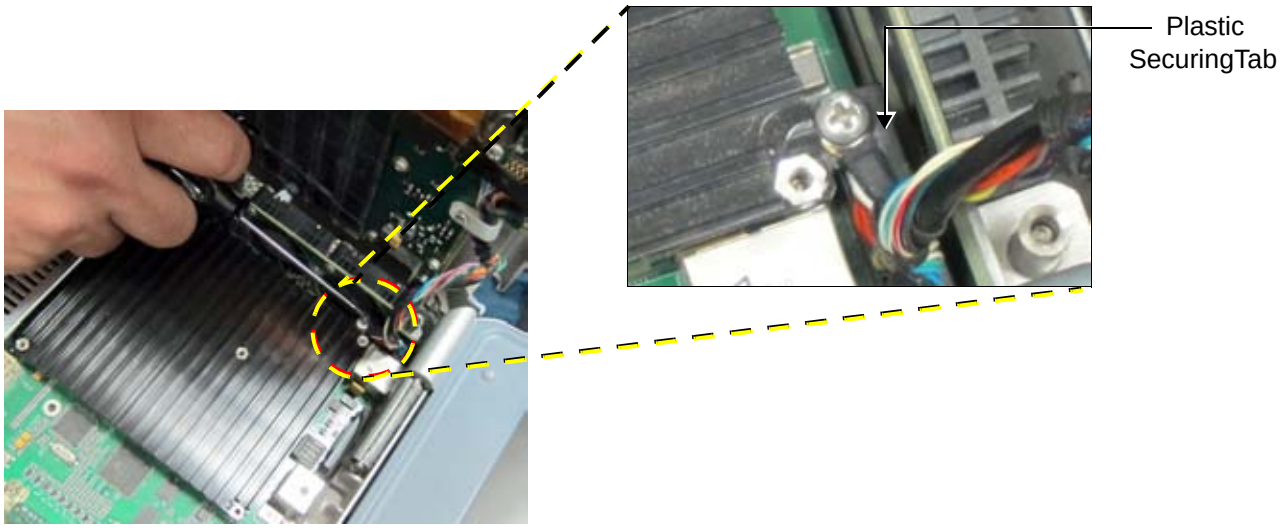


Figure 8-55 Releasing the Plastic Securing Tab from the BEP

NOTE: The following step may be viewed in the attached movie clip.

9) Using both hands, lift the BEP out of the Bottom Assembly and remove it from the system, as shown in Figure 8-65 below.

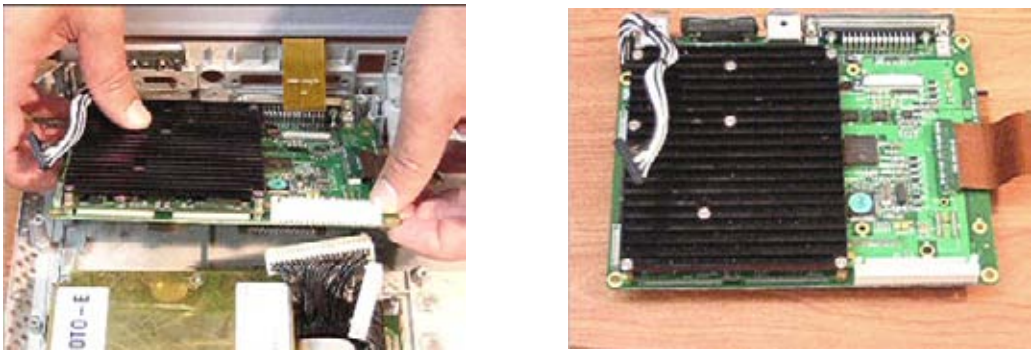


Figure 8-56 Removing the BEP from the Bottom Assembly

NOTE: When removing the BEP for replacement with the SATA BEP, disconnect the control panel/keyboard cable (Figure 8-57) from the parallel BEP you have just removed and keep this cable for installing on the SATA BEP.

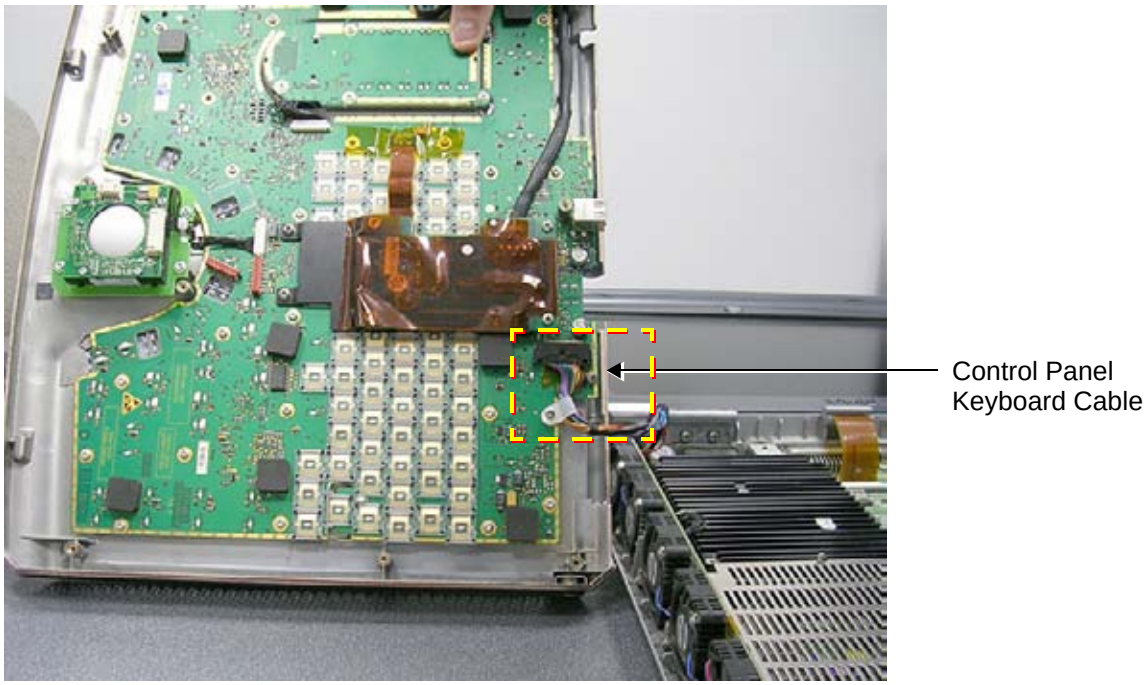


Figure 8-57 Control Panel / Keyboard Cable

8-3-3-5 BEP Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the BEP Removal Procedure.

*NOTE: The **SATA BEP** has an adaptor bracket, which is required for its installation. The bracket is shown on the left in Figure 8-58; in the picture on the right, the bracket is shown in position in the Vivid-i™/ Vivid-q™ scanner. Notice that the bracket sits on the PCMCIA slot-flap, which is pressed open while the adaptor bracket is positioned on the flap itself. To install the adaptor bracket, the flap is pressed open (Figure 8-59) and the adaptor bracket is placed in position. The procedure is described below.*

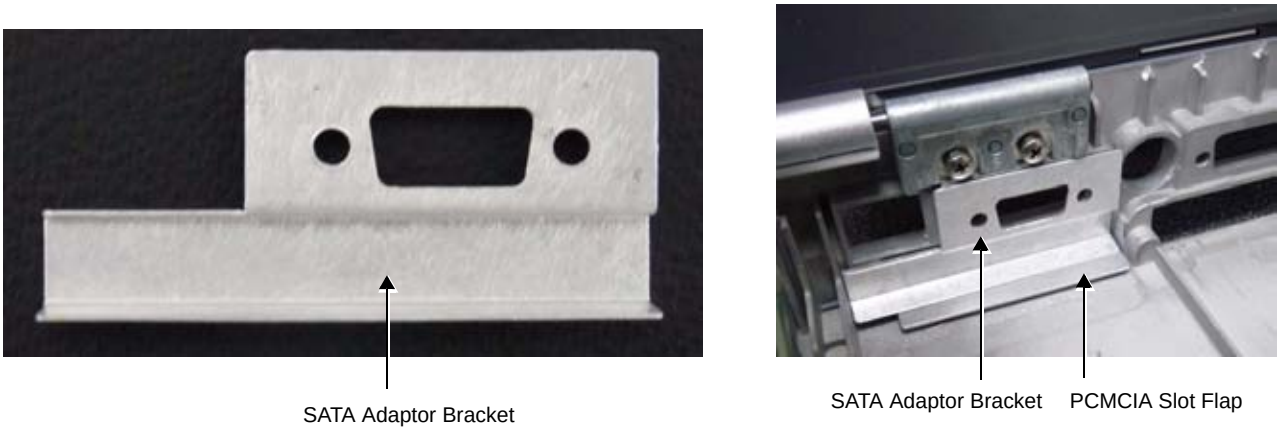


Figure 8-58 SATA Adaptor Bracket

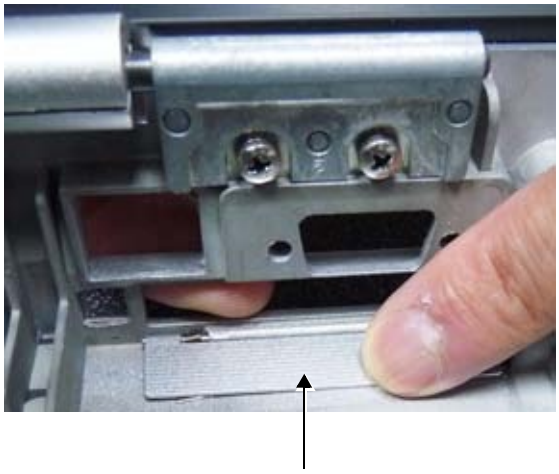


Figure 8-59 PCMCIA Slot Flap Pressed Open

8-3-3-5-1 Preparation Procedure

1) Press the PCMCIA slot-flap open and hold it down as shown in Figure 8-59.

2.) Place the adaptor bracket in position as shown on the right in figure Figure 8-58 and press it firmly against the Vivid-i™/ Vivid-q™ chassis.

NOTE: *Figure 8-60* shows *a view from the rear of the* Vivid-i™/ Vivid-q™ *showing the adaptor bracket closing off the PCMCIA slot.*

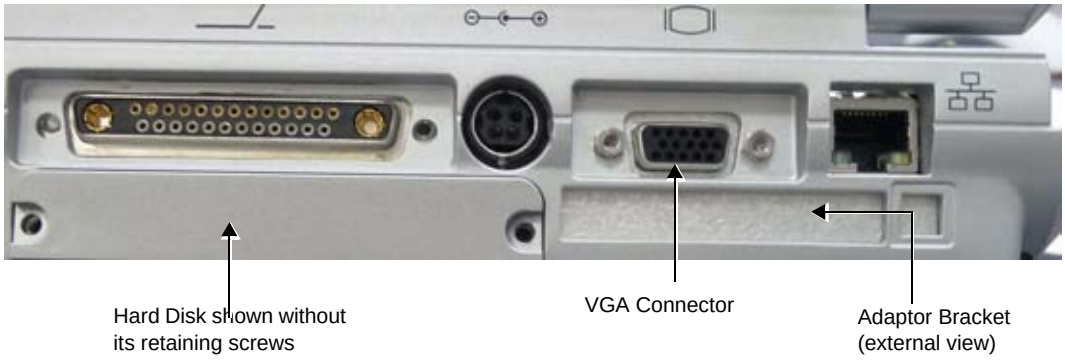


Figure 8-60 Rear View of the Vivid-i™/ Vivid-q™ Scanner after SATA BEP Installation

3.) Connect the control panel/keyboard cable (if previously removed from an ATA BEP; see Figure 8-57) to the SATA BEP.

Proceed to install the SATA BEP as described in the next procedure.

8-3-3-5-2 BEP Installation

1) Carefully return the new BEP to the original position on the Bottom Assembly - refer to Figure 8-56 on page 8-48.

Note: When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

2) Check that the BEP is seated correctly then return and fasten the four screws (previously removed) to secure the BEP to the Bottom Assembly - refer to Figure 8-54 on page 8-47.

3) Re-connect all the cables to the BEP:

Proceed as follows (refer to Figure 8-53 on page 8-46):

a.) Re-connect the Speaker-to-BEP power cable
b.) Re-connect the Fan-to-BEP power cable.
c.) Re-connect the HVPS-to-BEP power cable.
d.) Re-connect the BEP-to-RFI Flex cable.
e.) Re-connect the LCD Flex ribbon cable (carefully push back and secure the two connector latches).

4.) Return and fasten the two securing nuts previously removed (one on each side of the VGA Connector, located on the Vivid-i™/ Vivid-q™ rear panel), as shown Figure 8-52.

5) Return the Control Panel and Keyboard, as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.

6) Return the Hard Disk, as described in the Hard Disk Installation Procedure on page 8 - 8.

7) Re-install the battery as described in the Battery Installation Procedure on page 8 - 6.

8) Return the bearing handle as described in the Bearing Handle Installation Procedure on page 8 - 4.

9.) Turn ON the system and boot-up.

10.) Perform the PMC Update procedure, as described in Installation of PMC Version on page 8 - 139.

11.) Perform the BIOS Update procedure, as described in BIOS Firmware Update on page 8 - 123.

Note: If ***both*** the Back End and the Hard Disk are being replaced simultaneously, continue to the next step. If only the Back End is being replaced, skip step 12 and proceed to step 13, below.

12) Perform the steps required to burn the LCD type onto the newly-installed Back End, as described in step 10 on page 8-63 through step 13 on page 8-64.

13) Perform a complete functional check of the system, as described in *Chapter 4 - Functional Checks.*

14.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-3-4 BIOS Battery Replacement

NOTE: Since the BIOS battery is not available as a spare part (due to shelf life), it should be obtained locally. The battery model is CR2032.

8-3-4-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the BEP replacement procedures.

8-3-4-2 Time Required

15 minutes

8-3-4-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-4-4 BIOS Battery Removal Procedure

1) Remove the BEP, as described in the BEP Removal Procedure on page 8 - 45.
2) Take out the BIOS battery located on the bottom of the BEP, as shown in Figure 8-61.

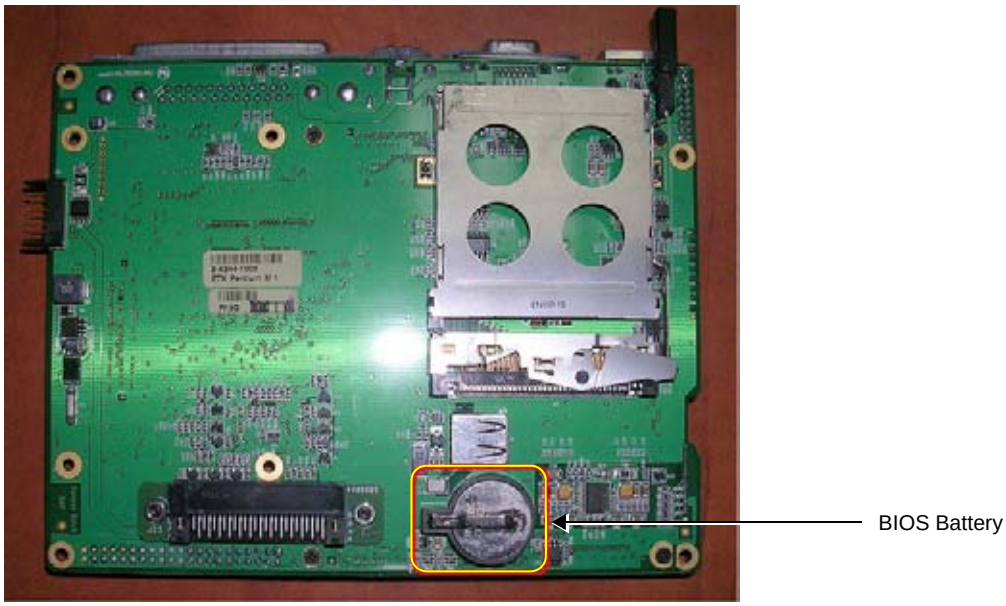


Figure 8-61 BEP - Location of BIOS Battery

8-3-4-5 BIOS Battery Installation Procedure

NOTE: Before proceeding, refer to the Preparation Procedure on page 8 - 50.

1) Fit a new BIOS battery in position on the BEP - refer to Figure 8-61.
2) Re-install the BEP, as described in the BEP Installation Procedure on page 8 - 49.
3.) Turn ON the system and boot-up.
4.) Adjust to the correct date and time settings - see Date and Time Adjustments on page 3 - 77.
5.) Proceed to perform the following functionality test:
   - Battery Parameters Test on page 7 - 103

8-3-5 HVPS Replacement Procedure

8-3-5-1 Tools

Use the appropriate flat and Phillips-type screw drivers, as indicated in the HVPS replacement procedure.

8-3-5-2 Time Required

15 minutes

8-3-5-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-5-4 HVPS Removal Procedure

1) Make sure the Vivid-i™/ Vivid-q™ LCD Display cover is securely closed and place the scanner face down. Remove the battery as described in the Battery Removal Procedure on page 8 - 5.

2) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.

NOTE: The following step may be viewed in the attached movie clip.

3) Disconnect each of the two Power Supply cables from the DC Power Supply (HVPS-to-BEP and HVPS-to-RFI), as shown below.

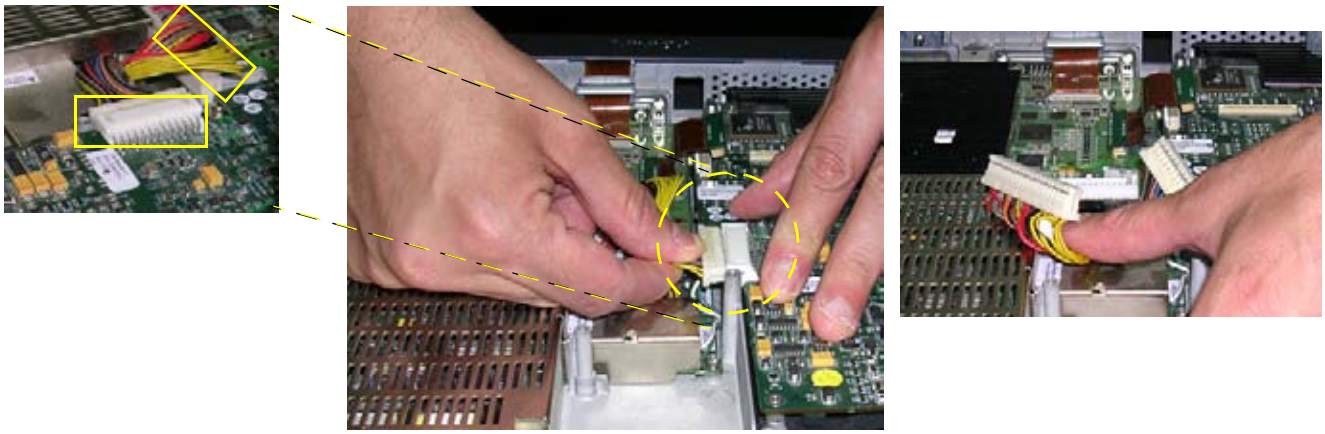


Figure 8-62 Disconnecting the DC Power Supply Cables

NOTE: The following step may be viewed in the attached movie clip.

4) Loosen the five screws that secure the DC Power Supply to the Bottom Assembly, as shown in Figure 8-63 below.

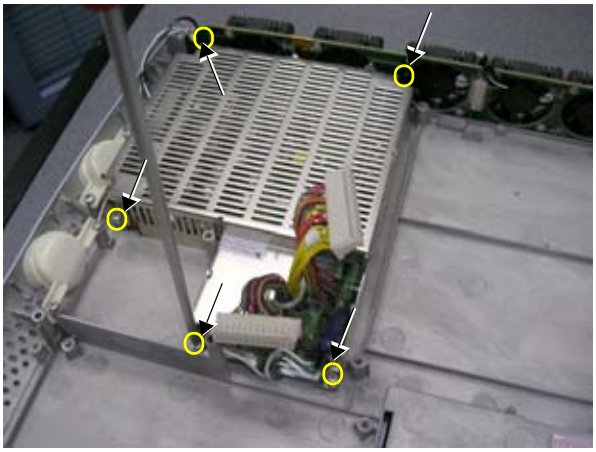


Figure 8-63 Loosening the Screws on the DC Power Supply

NOTE: The following step may be viewed in the attached movie clip.

5) Carefully lift the DC power supply *upwards* and remove it from the Bottom Assembly, as shown in Figure 8-64 below.

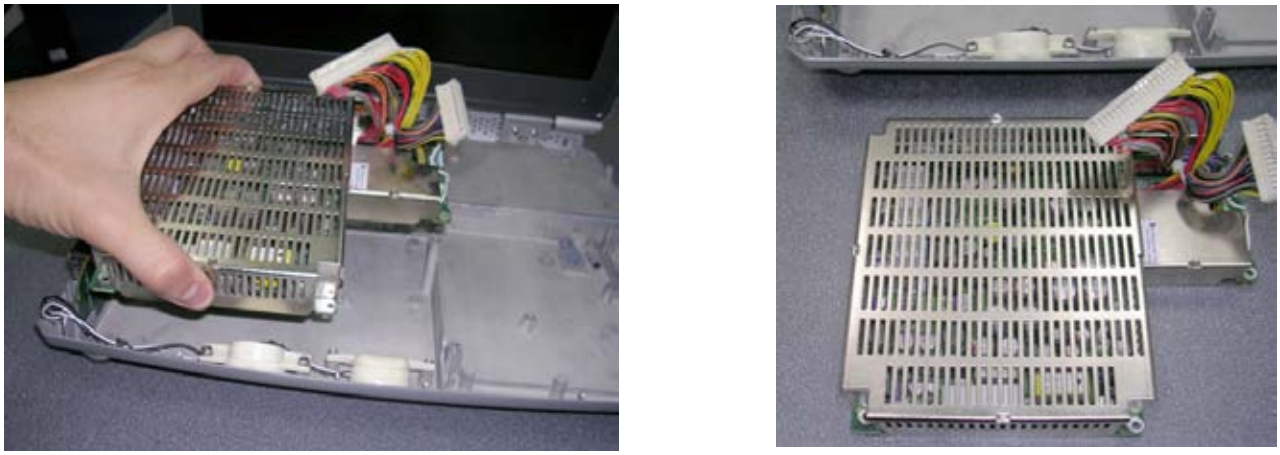


Figure 8-64 Removing the DC Power Supply

6.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-3-5-5 HVPS Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the HVPS Removal Procedure.

1) Return the HVPS to its original position - refer to Figure 8-64, above.
2) Return the five screws and fasten the HVPS in position on the Bottom Assembly, as shown in Figure 8-63 on page 8-54.
3) Reconnect each of the two Power Supply cables to the DC Power Supply (HVPS-to-BEP and HVPS-to-RFI), as shown in Figure 8-62 on page 8-53.
4) Return the bearing handle, as described in the Bearing Handle Installation Procedure on page 8 - 4.
5) Make sure the Vivid-i™/ Vivid-q™ LCD Display cover is securely closed and place the scanner face down. Re-install the battery as described in the Battery Installation Procedure on page 8 - 6.
6.) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
   - Chassis Current Leakage Test on page 10 - 24
   - Calibration Tests on page 7 - 25
   - Full System Test on page 7 - 10

8-3-6 Fan Replacement Procedure

NOTE: This section describes the replacement procedure for the Fan Assembly which is supplied as part of the Fans and Speaker Kit - Part No. 2412826.

8-3-6-1 Tools

Use the appropriate flat and Phillips-type screw drivers, as indicated in the fan replacement procedure.

8-3-6-2 Time Required

15 minutes

8-3-6-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-6-4 Fan Removal Procedure

1) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
2) Remove the Control Panel and Keyboard, as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
3) Unscrew and remove the two screws that secure the Fan Assembly to the Bottom Assembly as shown in Figure 8-65 below.

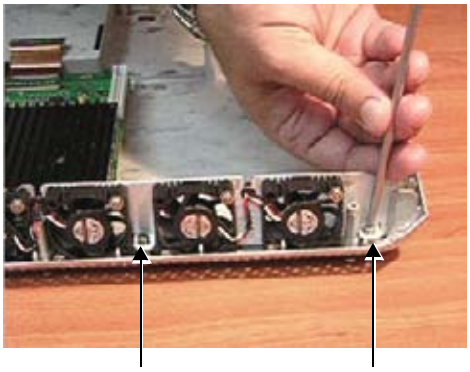


Figure 8-65 Removing the Screws from the Fan Assembly

NOTE: The following steps may be viewed in the attached movie clip.

4.) Disconnect the speaker cable from the fan assembly, as shown in Figure 8-66 below

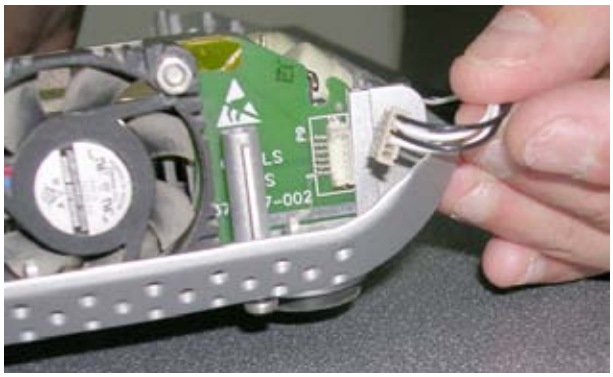


Figure 8-66 Disconnecting the Speaker Cable

5) Using both hands, lift the Fan Assembly *upwards* from the *front* and then the *rear* to remove it from the Bottom Assembly; lay it down adjacent to the system, ready for the next step as shown in Figure 8-67 below.

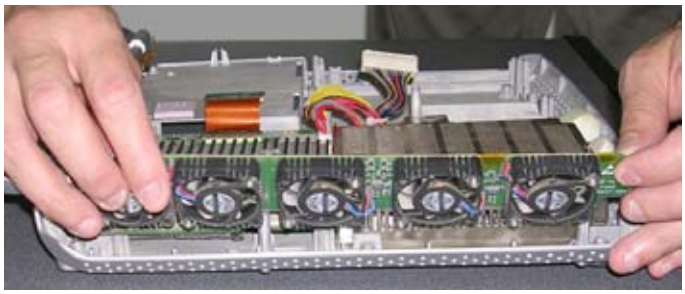


Figure 8-67 Removing the Fan Assembly

6) Disconnect the Fan cable from the BEP and completely remove the Fan Assembly from the system, as shown in Figure 8-68 below.

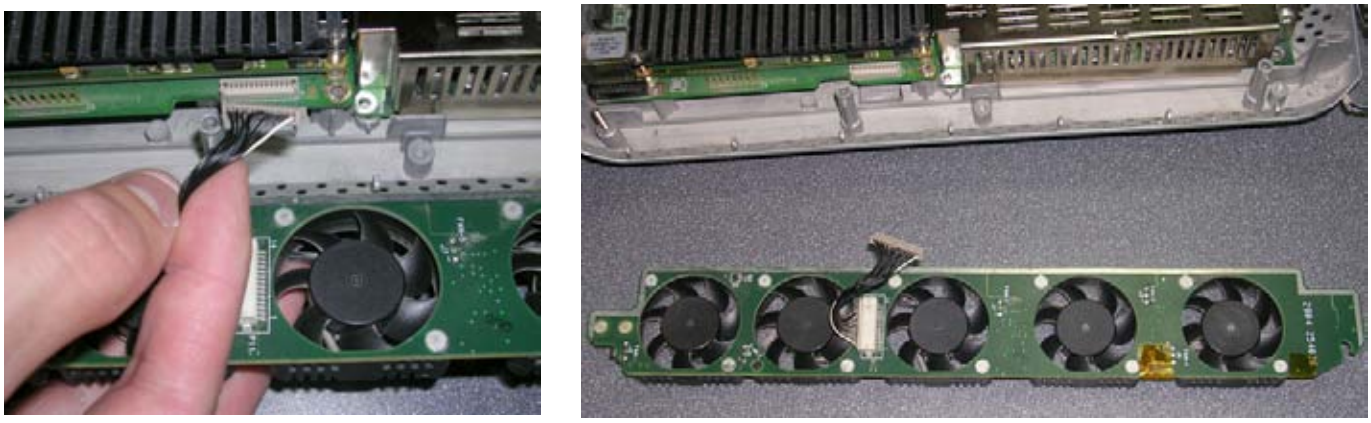


Figure 8-68 Disconnecting the Fan Cable from the BEP

8-3-6-5 Fan Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the Fan Removal Procedure.

1) Connect the replacement Fan cable to the BEP- refer to Figure 8-68, above.
2) Using both hands, carefully mount the replacement Fan Assembly into position on the Bottom Assembly - refer to Figure 8-67 on page 8-57.
3) Make sure the Fan Assembly is seated in the correct position. Return and fasten the two screws (previously removed) to secure the Fan Assembly to the Bottom Assembly, as shown in Figure 8-65 on page 8-56.
4.) Reconnect the speaker cable to the fan assembly, as shown in Figure 8-66.
5) Return the Control Panel and Keyboard, as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.
6) Return the bearing handle, as described in the Bearing Handle Installation Procedure on page 8 - 4.
7.) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
   - Chassis Current Leakage Test on page 10 - 24
   - Calibration Tests on page 7 - 25

8-3-7 Speaker Assembly Replacement Procedure

NOTE: This section describes the replacement procedure for the Speaker Assembly which is supplied as part of the Fans and Speaker Kit - Part No. 2412826.

8-3-7-1 Tools

Use the appropriate flat and Phillips-type screw drivers, a wire cutter and the appropriate Hex wrench keys as indicated in the speaker replacement procedure.

8-3-7-2 Time Required

15 minutes

8-3-7-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-7-4 Speaker Assembly Removal Procedure

1) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
2) Remove the Control Panel and Keyboard, as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
3) Loosen and remove the two screws on each of the speaker housings (four in total).
4) Disconnect the speaker cables from the fan assembly.
5) Gently lift the speaker assembly towards you and remove from the system.

8-3-7-5 Speaker Assembly Installation Procedure

1) Return a replacement speaker assembly to the original position, ensuring that the two connection legs of each speaker are facing the two connection legs of the opposite speaker, otherwise an electrical short may occur.
2) Reconnect the speaker cables to the fan assembly.
3) Return and fasten the two screws on each of the speaker housings (four in total), previously removed.
4.) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
   - Chassis Current Leakage Test on page 10 - 24
   - Calibration Tests on page 7 - 25
   - Full System Test on page 7 - 10
   - Speakers Tests on page 4 - 23

8-3-8 LCD Display Replacement Procedure

8-3-8-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the LCD Display replacement procedure.

8-3-8-2 Time Required

15 minutes

8-3-8-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-8-4 LCD Display Removal Procedure

1) Remove the bearing handle, as described in the Bearing Handle Removal Procedure on page 8 - 3.
2) Remove the Control Panel and Keyboard as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
3.) Remove the LCD Display Frame as described in the LCD Display Frame Removal Procedure on page 8 - 34.

NOTE: The following step may be viewed in the attached movie clip.

4.) Loosen and remove the four screws that fasten the LCD Display to the Rear Cover & Latch Assembly, as shown in shown in Figure 8-69 below.

Figure 8-69 Removing the Screws from the LCD Display

NOTE: The following step may be viewed in the attached movie clip.

5.) Disconnect the LCD Flex ribbon cable from the BEP, as shown in Figure 8-70 below.
Use a flat screwdriver to carefully release the cable from the connector.

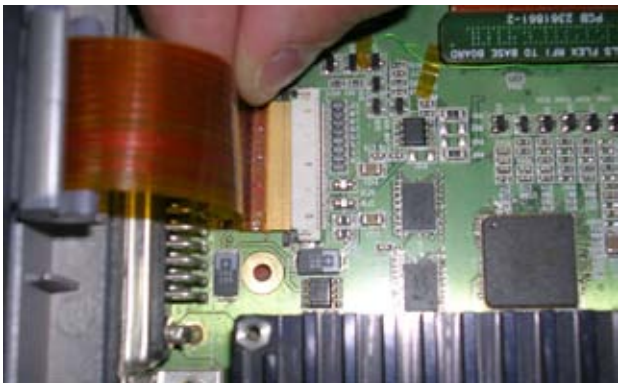


Figure 8-70 Disconnecting the LCD Flex Ribbon Cable

6.) Carefully disconnect the microphone from the LCD Flex.

NOTE: The following step may be viewed in the attached movie clip.

7.) Using both hands, carefully lift the LCD Display upwards and remove it from the Rear Cover & Latch Assembly, as shown in Figure 8-71 below.
Take care not to damage the LCD Flex ribbon cable when performing this step.

Figure 8-71 Removing the LCD Display

8-3-8-5 LCD Display Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clips previously referenced in the LCD Display Removal Procedure.

1) Using both hands, carefully lift the replacement LCD Display into position on the Rear Cover & Latch Assembly (refer to Figure 8-71).
   Take care not to damage the LEC Flex ribbon cable when performing this step.
2.) Carefully re-connect the microphone to the LCD Flex.
3) Use both hands to re-connect the LCD Flex ribbon cable to the BEP - refer to Figure 8-70 on page 8-61.
4) Return and fasten the four screws to secure the LCD Display to the Rear Cover & Latch Assembly (refer to Figure 8-69 on page 8-60).
5) Return the LCD Display Frame, as described in the LCD Display Frame Installation Procedure on page 8 - 35.
6) Check that the LCD Display can be tilted *upwards* and *downwards*, and that it holds its set position.
7) Return the Control Panel and Keyboard as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.
8) Return the bearing handle as described in the Bearing Handle Installation Procedure on page 8 - 4.
9) Boot-up the system into Maintenance Mode.

10) From Windows Explorer, go to the directory: **C:\Marlin\Target\bin** (see Figure 8-72 below).

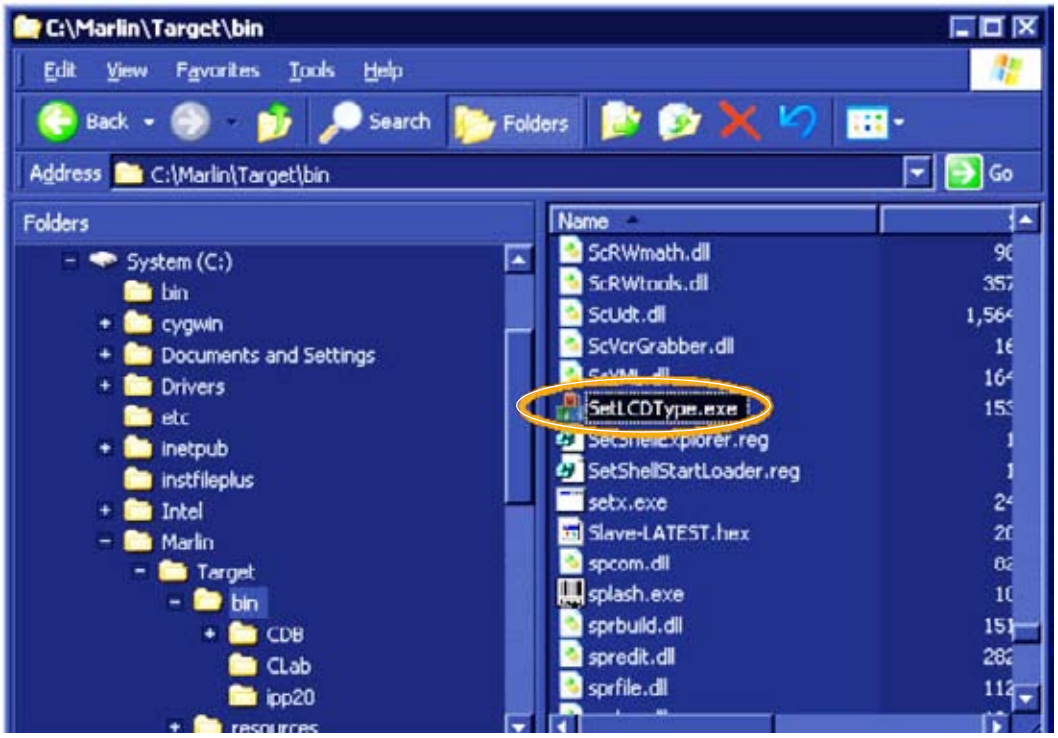


Figure 8-72 Selecting SetLCDType Utility

11.) Double-click on **SetLCDType.exe** to run this utility.

The Set LCD Type dialog opens (Figure 8-73):

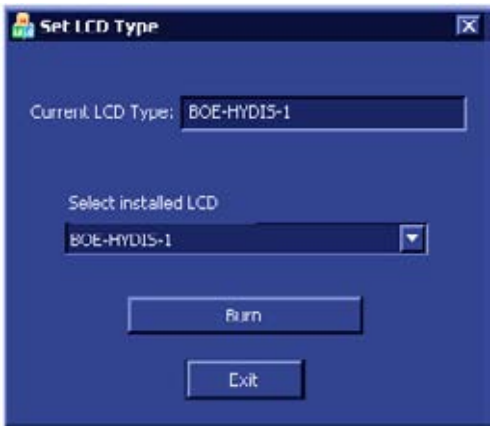


Figure 8-73 Set LCD Type Dialog

12) Select the LCD screen type that is installed on the system, as shown in the example below.

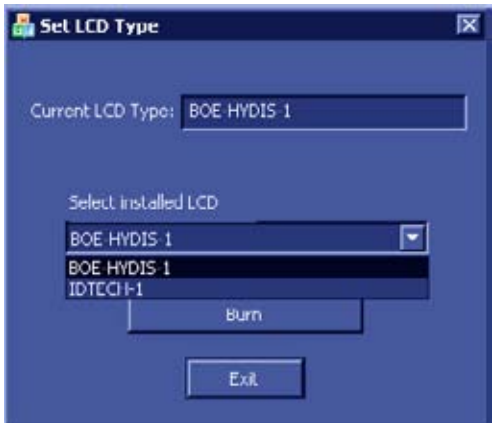


Figure 8-74 Selecting LCD Type Installed on the System

13) Click the **Burn** button.

The system is now updated with the new LCD configuration.

14) For the final stage of the LCD Display installation procedure, proceed to calibrate the newly-installed LCD Display by making any adjustments required to the *Brightness*, *Contrast* and/or *Blue Tint,* as described in the LCD Display Adjustments and Calibration on page 6 - 1.

15.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Microphone Test on page 4 - 24
- Full System Test on page 7 - 10

8-3-9 LCD Flex Cable Replacement Procedure

8-3-9-1 Tools

Use the appropriate Phillips and flat screw drivers, as indicated in the LCD Flex Cable replacement procedure.

8-3-9-2 Time Required

15 minutes

8-3-9-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-9-4 LCD Flex Cable Removal Procedure

1) Disconnect the AC cable and battery.
2) Remove the Control Panel and Keyboard as described in the Control Panel and Keyboard Removal Procedure on page 8 - 16.
3) Remove the LCD Display Frame as described in the LCD Display Frame Removal Procedure on page 8 - 34.
4) Remove the LCD Display as described in the LCD Display Removal Procedure on page 8 - 60.
5.) Carefully disconnect the microphone from the LCD Flex.
6) Using both hands, carefully lift the LCD Display upwards and remove it from the Rear Cover & Latch Assembly, as shown in Figure 8-75.

Figure 8-75 Removing the LCD Display

NOTE: Take care not to damage the LCD Flex ribbon cable when performing this step.

Flex Cable Replacement Procedure

1) Remove the kapton tape from the LCD rear panel and disconnect the flex cable - see Figure 8-76.

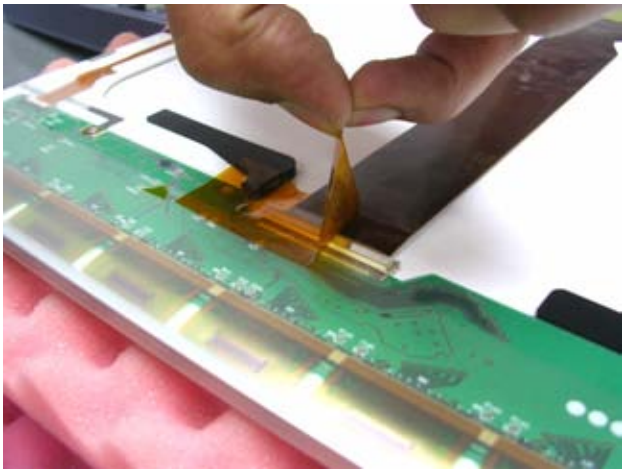


Figure 8-76 Removing Tape from LCD Rear Panel

2) Connect the new flex cable to LCD rear panel connector, as shown in Figure 8-77.

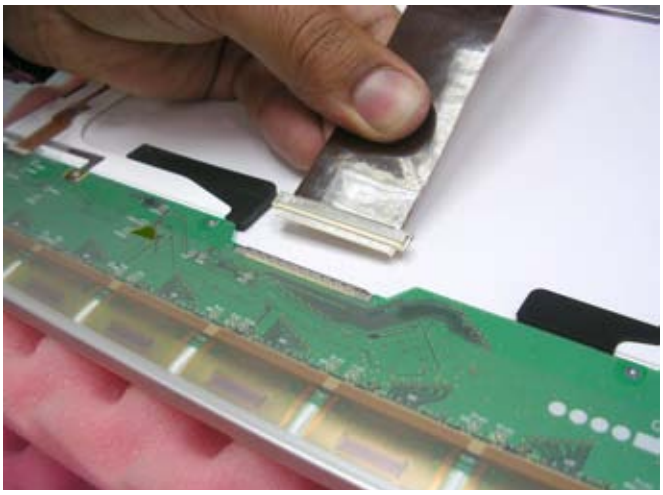


Figure 8-77 Connecting the Flex Cable to the LCD Rear Panel

3) Connect the flex cable to the LCD rear panel connector.

4) Adhere the kapton tape on the LCD rear panel connector, see Figure 8-78.

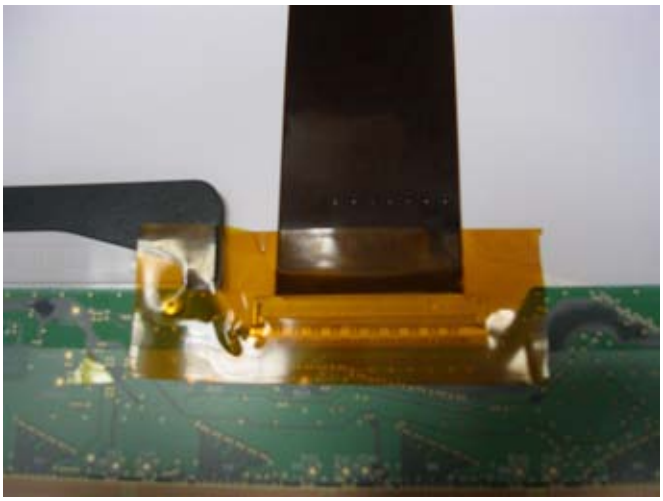


Figure 8-78 Adhering Kapton Tape on the LCD Rear Panel Connector

5) Using both hands, carefully lift the LCD Display upwards and install it back to the Rear Cover & Latch Assembly, see Figure 8-75 on page 8-65.

6.) Connect the flex cable to the BEP.

7) Return the LCD Display as described in the LCD Display Installation Procedure on page 8 - 62.

8) Return the LCD Display Frame, as described in the LCD Display Frame Installation Procedure on page 8 - 35.

9) Check that the LCD Display can be tilted upwards and downwards, and that it holds its set position.

10) Return the Control Panel and Keyboard as described in the Control Panel and Keyboard Installation Procedure on page 8 - 18.

11.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Microphone Test on page 4 - 24
- Full System Test on page 7 - 10

8-3-10 Microphone Assembly Replacement Procedure

NOTE: This section describes the replacement procedure for the Microphone Assembly which is supplied as part of the LCD Panel Kit - Part No. S2422471.

8-3-10-1 Tools

None required.

8-3-10-2 Time Required

10 minutes

8-3-10-3 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-3-10-4 Microphone Assembly Removal Procedure

1) Remove the LCD Display Frame as described in the LCD Display Frame Removal Procedure on page 8 - 34.

NOTE: The following steps may be viewed in the attached movie clip.

2) Carefully unclip and release the microphone from the *upper right* side of the LCD display, as shown in Figure 8-79 below.

Figure 8-79 Releasing the Microphone

3) Release the microphone cable from its seating in the cable groove that runs along the side and bottom of the LCD Display.

Note: An adhesive rubber channel is fitted inside the groove to hold the cable in place.

4.) Disconnect the miniature plug from the cable connector below the LCD Display as shown in Figure 8-80.

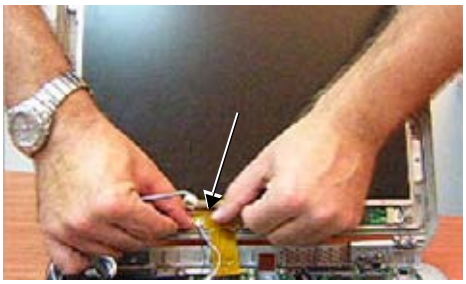


Figure 8-80 Disconnecting the Miniature Plug

5.) Remove the Microphone Assembly from the system.

8-3-10-5 Microphone Assembly Installation Procedure

NOTE: When performing the following installation procedure steps, it may be helpful to review the appropriate movie clip previously referenced in the Microphone Assembly Removal Procedure.

1) Using the replacement Microphone Assembly, re-connect the miniature plug to the cable connector below the LCD Display (refer to Figure 8-80 on page 8-68).

2) Feed the microphone cable into the cable groove that runs along the side and bottom of the LCD Display.

Note: An adhesive rubber channel is fitted inside the groove to hold the cable in place.

3) Clip the microphone into position, making sure it is properly seated on the *upper right* side of the LCD Display (refer to Figure 8-79 on page 8-68).

4) Return the LCD Display Frame as described in the LCD Display Frame Installation Procedure on page 8 - 35.

5.) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24
- Microphone Test on page 4 - 24

Section 8-4
SafeLock Cart Components Replacement

NOTE: This section describes replacement procedures for a new-type SafeLock Cart only (P/N R2426000 [U.S.A] and R2427000 [Europe]).

WARNING: This equipment must not be operated within 15 feet of any magnetic equipment.

DANGER: Electrical hazards exist at several points in the system. Familiarize yourself with all hazardous voltages and high current levels before removing any of the covers.

DANGER: DO NOT wear the ESD wrist band strap when removing parts from the power supply unit. Before removing any part of the power unit, turn the power OFF and disconnect the power cord.

WARNING: Before removing circuit boards, turn the power OFF and wear the ESD wrist band strap.

8-4-1 Overview of SafeLock Cart Replaceable Components

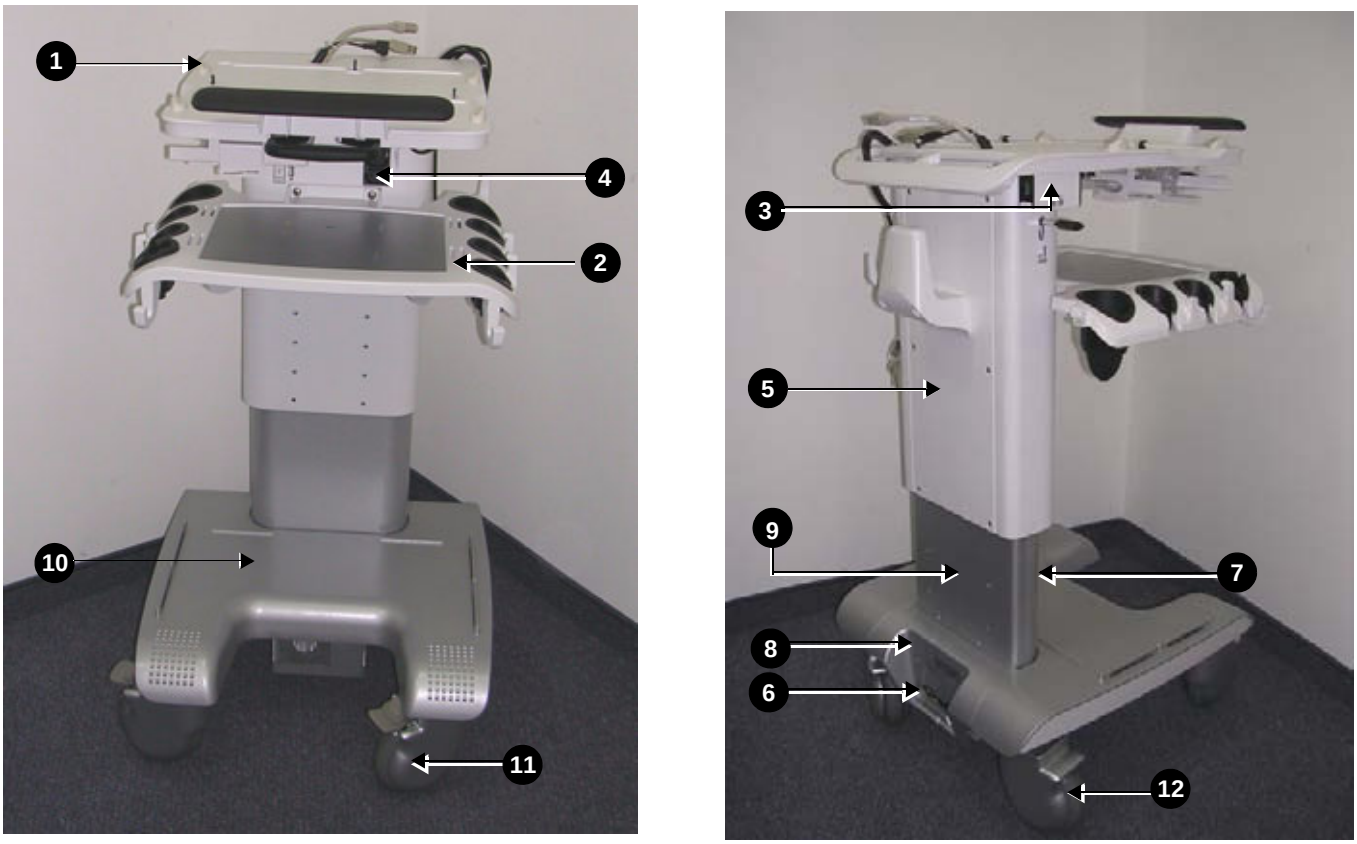


Figure 8-81 Vivid-i™/ Vivid-q™ SafeLock Cart Components

Table 8-2 Vivid-i™/ Vivid-q™ SafeLock Cart Components

Label	Item	Label	Item
1	Top Shelf Assembly (with handle)	7	Bottom Cover - Front
2	Probe Shelf (with probe holders)	8	Bottom Cover - Rear (AC Assembly Cover)
3	LAN Isolation Box	9	Rear Lower Cover
4	Peripheral Power Outlet	10	SafeLock Cart Bottom Assembly
5	Rear Upper Cover	11	Front Wheels (with locking lever)
6	AC Distribution Assembly (behind cover)	12	Rear Wheels

8-4-2 SafeLock Cart Replacement Procedures - Quick Reference List

For quick reference, the SafeLock Cart component replacement procedures are described in the following sub-sections:

- Upper Cover (Rear) - see page 8-73
- AC Cable Hook - see page 8-74
- Lower Cover (Rear) - see page 8-75
- AC Distribution Assembly - see page 8-76
- Peripheral Power Cable - see page 8-78
- Main Cable Harness - see page 8-83
- USB Board - see page 8-84
- Gas Spring - see page 8-86
- DVD Holder - see page 8-89
- LAN Isolation Box & Holder - see page 8-90
- Top Shelf Assembly - see page 8-91
- Handrest - see page 8-93
- Probe Shelf Assembly - see page 8-94
- Probe Cable Hooks - see page 8-96
- Front Wheels - see page 8-97
- Rear Wheels - see page 8-99

8-4-3 Upper Cover (Rear) Replacement Procedure

8-4-3-1 Tools

Appropriate Phillips screwdriver.

8-4-3-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-3-3 Upper Cover (Rear) Removal Procedure

Remove the retaining screws of the upper rear cover and while supporting the cover with one hand, carefully remove the cover (see Figure 8-82).

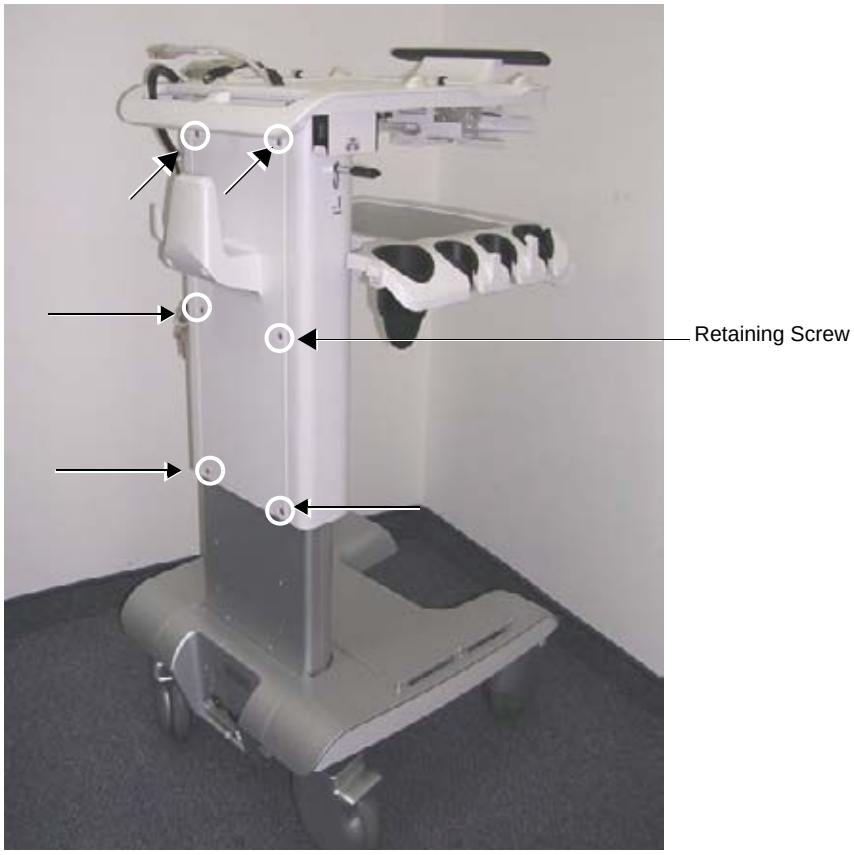


Figure 8-82 Upper Cover (Rear) Removal

8-4-3-4 Upper Cover (Rear) Installation Procedure

1.) Return the cover to the correct position on the rear of the SafeLock Cart (see Figure 8-82).

2) While holding the cover to prevent it from falling, return and fasten the two upper screws (see Figure 8-82).

3) Fasten the four remaining screws that secure the upper cover (rear).

4) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
- Chassis Current Leakage Test on page 10 - 24

8-4-4 AC Cable Hook Replacement Procedure

8-4-4-1 Tools

Appropriate Phillips screwdriver.

8-4-4-2 AC Cable Hook Removal Procedure

From the Upper Cover (rear), unscrew the four AC Cable Hook retaining screws (see Figure 8-83) and remove the cable hook holder.

Figure 8-83 AC Cable Hook

8-4-4-3 AC Cable Hook Installation Procedure

1.) Position the AC Cable Hook on the Upper Cover (rear) and return and fasten the four retaining screws.

2) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
- Chassis Current Leakage Test on page 10 - 24

8-4-5 Lower Cover (Rear) Replacement Procedure

8-4-5-1 Tools

Appropriate Phillips screwdriver.

8-4-5-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-5-3 Lower Cover (Rear) Removal Procedure

Remove six retaining screws of the lower cover (rear) and while supporting the cover with one hand, gently remove the cover - see Figure 8-84).

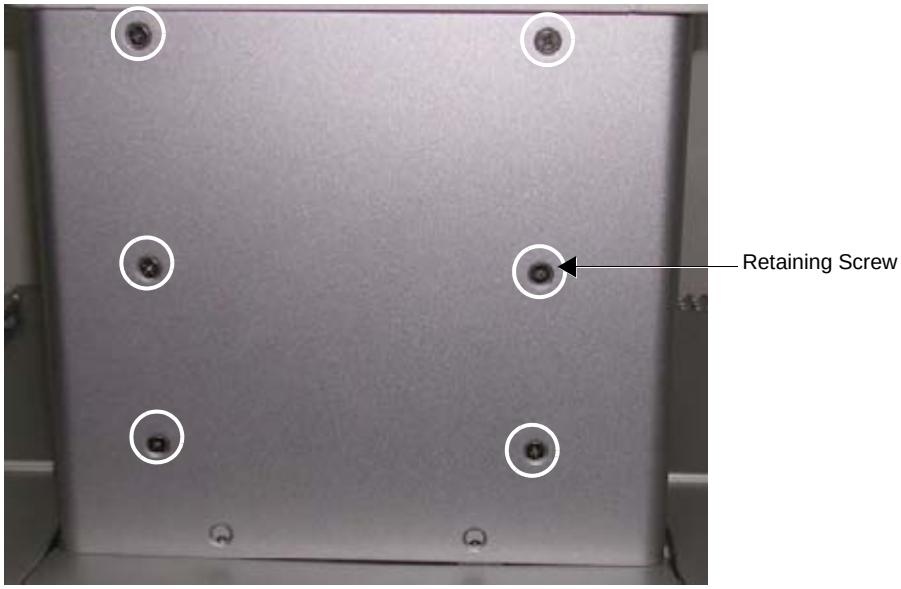


Figure 8-84 Lower Cover (Rear) Removal

8-4-5-4 Lower Cover (Rear) Installation Procedure

1) Return the cover to the correct position on the rear of the SafeLock Cart - see Figure 8-84.
2) While holding the cover to prevent it from falling, fasten the retaining screws of the lower cover (rear).
3) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
   - Chassis Current Leakage Test on page 10 - 24

8-4-6 AC Distribution Assembly Replacement Procedure

8-4-6-1 Tools

Appropriate flat and Phillips screwdrivers and a wire cutter

8-4-6-2 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-6-3 AC Distribution Assembly Removal Procedure

1) Turn OFF power to the SafeLock Cart and disconnect the AC power cable from the AC input assembly at the base of the cart (rear).
2) Remove the Upper Cover (Rear), as described in the Upper Cover (Rear) Removal Procedure on page 8 - 73.
3) Remove the Lower Cover (Rear), as described in the Lower Cover (Rear) Removal Procedure on page 8 - 75.
4) Remove the three retaining screws of the AC Assembly Cover and remove the cover - Figure 8-85 below.

   The AC Distribution Assembly is now exposed, as shown in Figure 8-86.

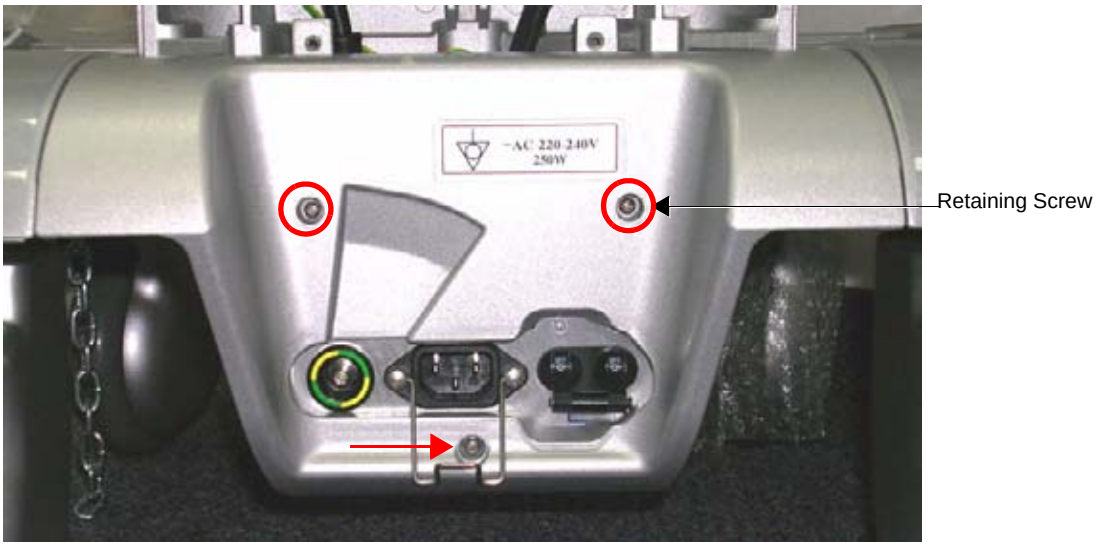


Figure 8-85 AC Distribution Assembly and Mounting Bracket

5) Cut all cable ties holding the cables in position.
6) Unscrew the metal cable fastener from the P1 cable connector (on the *right*) and remove the cable from its socket - see Figure 8-86.
7) Disconnect the peripheral power cable from the AC Distribution Assembly - see Figure 8-86.

8) Loosen and remove the ground screw fastened to the AC Distribution Assembly - see Figure 8-86.

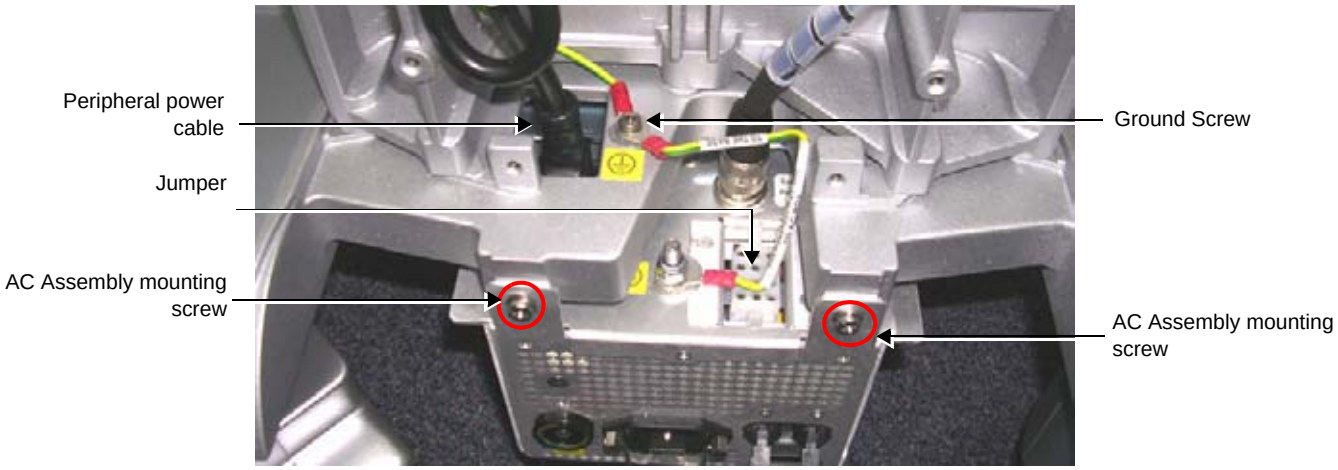


Figure 8-86 AC Distribution Assembly and Cable Sockets

9) Loosen and remove the two AC Assembly mounting screws that secure the AC Distribution Assembly to the mounting bracket on the SafeLock Cart chassis - see Figure 8-86.

10) Carefully pull the AC Distribution Assembly out towards you and remove it remove from the SafeLock Cart.

8-4-6-4 AC Distribution Assembly Installation Procedure

1) Return the replacement AC Distribution Assembly to its position on the SafeLock Cart chassis and secure it on the mounting bracket using the two screws (previously removed - see Figure 8-86, above).

2) Fasten the Ground screw to the AC Distribution Assembly - Figure 8-86, above.

3) Reconnect the peripheral power cable to the AC Distribution Assembly - Figure 8-86, above.

4) Secure all cables in position with new cable ties.

5) Return the AC Assembly cover and fasten the three screws (previously removed).

6) Return the Lower Cover (Rear), as described in the Lower Cover (Rear) Installation Procedure on page 8 - 75.

7) Return the Upper Cover (Rear), as described in the Upper Cover (Rear) Installation Procedure on page 8 - 73.

8) Reconnect the AC power cable to the AC Distribution Assembly at the base of the cart (rear) and turn ON power to the SafeLock Cart.

9) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
- Chassis Current Leakage Test on page 10 - 24

8-4-7 Peripheral Power Cable Replacement Procedure

8-4-7-1 Tools

Appropriate Phillips screwdriver and wire cutters.

8-4-7-2 Preparation

1) Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation.*
2) Remove the Upper Cover (rear) and Lower Cover (rear) of the SafeLock Cart as described in Upper Cover (Rear) Removal Procedure on page 8 - 73 and Lower Cover (Rear) Removal Procedure on page 8 - 75.

8-4-7-3 Peripheral Power Cable Removal Procedure

1) Disconnect the Peripheral Power cable from the AC Distribution Assembly.
2) Cut any cable ties that secure the cable.
3) Disconnect all grounding connections.
4) Remove the Peripheral Power socket by squeezing the plastic clip holders inwards (see Figure 8-87).
   Gently push the power socket inwards to release it.
5) Remove the power socket with its cable.

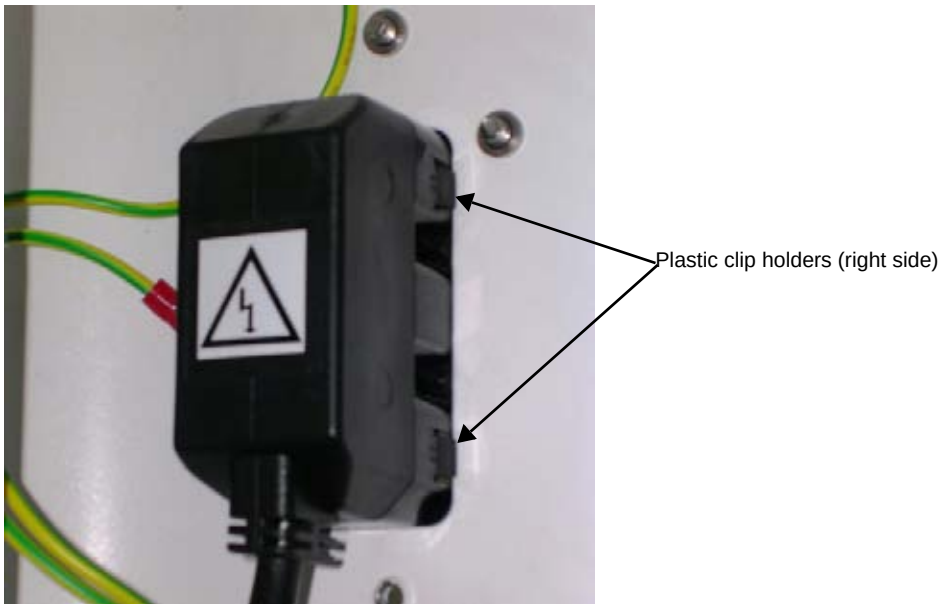


Figure 8-87 Peripheral Power Socket

8-4-7-4 Peripheral Power Cable Installation Procedure

Correct routing of the Peripheral AC Outlet cable is shown in Figure 8-88, below.

NOTE: Before starting the routing procedure adhere two plastic cable holders to the metal linear guide bracket as shown in Figure 8-88 (middle picture).

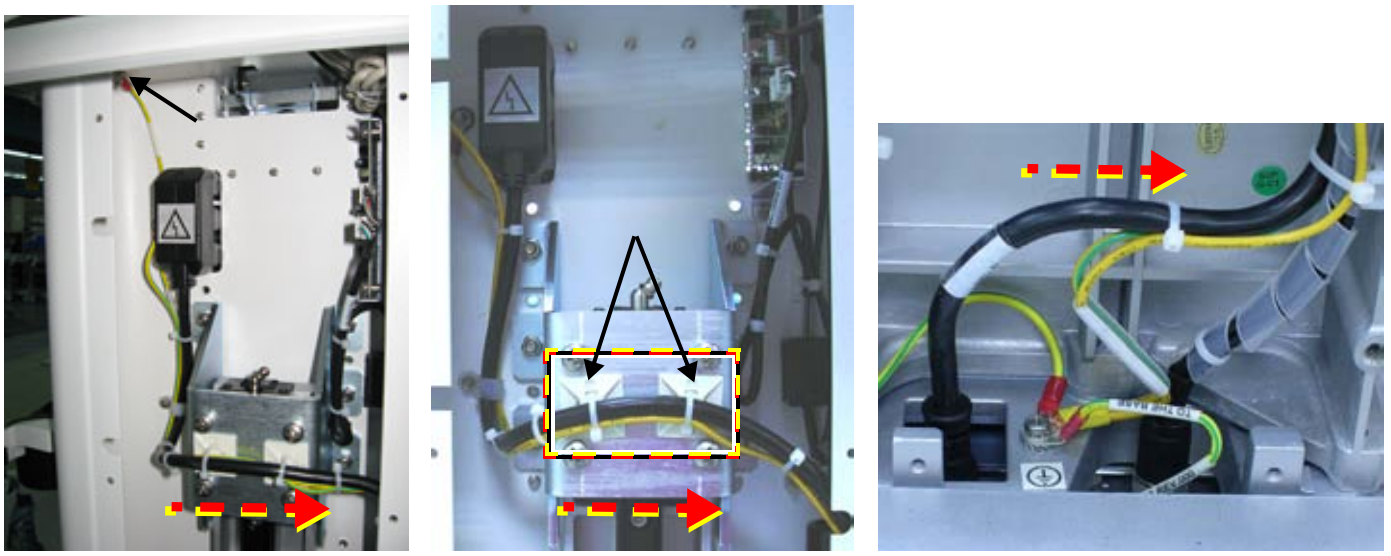


Figure 8-88 Routing of Peripheral AC Outlet Cable from Left to Right

1.) Insert the replacement Peripheral Power cable and power socket in position in the SafeLock's Upper Cover (front) (see item 4 in Figure 8-81 page 8-71).
2.) With the AC power socket plugged into the cart (Figure 8-88, left picture), connect the ground cable to the body of the cart.
3.) Route the Peripheral AC Outlet cable as shown in the middle picture of Figure 8-88.
4.) Secure the cable with the cable clamp in the direction shown in Figure 8-89.

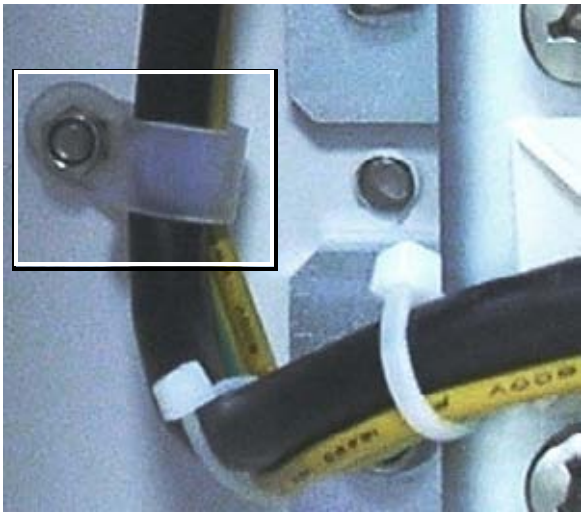


Figure 8-89 Correct Installation of Cable Clamp

5.) Route the cable and the ground cable over the plastic cable holders (Figure 8-88 middle picture) and secure the cables with the tie-wraps.

6.) Continue routing the Peripheral AC Outlet cable towards the right hand side of the Rear Upper Cover and *downwards* - Figure 8-90.

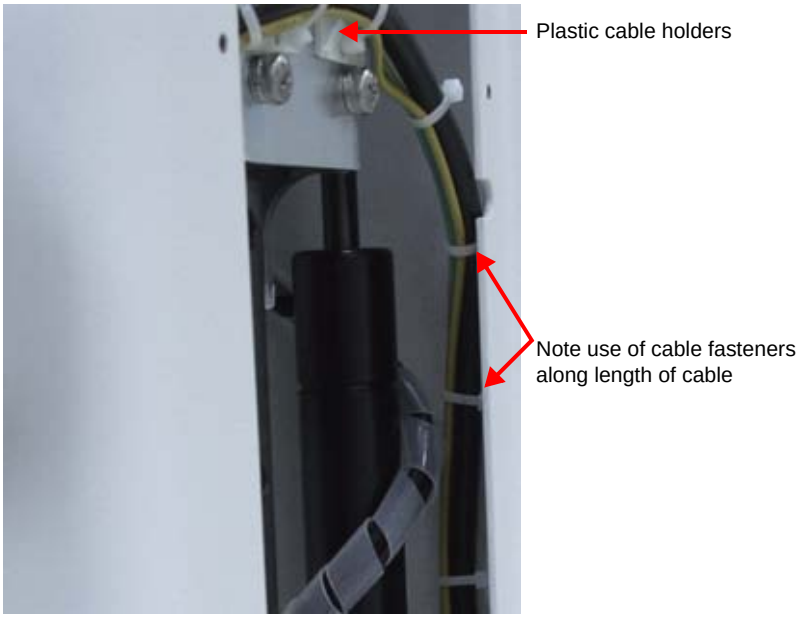


Figure 8-90 Routing of Cable Downwards inside Rear Upper Cover

7.) Fasten the Peripheral AC Outlet cable to the Main Harness cable as shown in Figure 8-91.

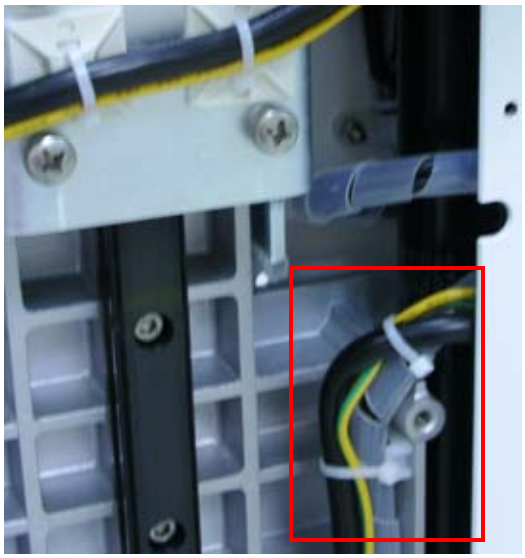


Figure 8-91 Peripheral AC Outlet Cable Fastened to Main Harness Cable

8.) Plug the Peripheral AC Outlet cable into the power supply and connect the Ground lead to the body of the cart - Figure 8-92.

9.) Replace all tie-wraps.

Figure 8-92 Peripheral AC Outlet and Ground Cable Connected

10.) Shorten the USB power cable by folding it into a "u" shape and fasten together with tie wraps as shown in Figure 8-93.

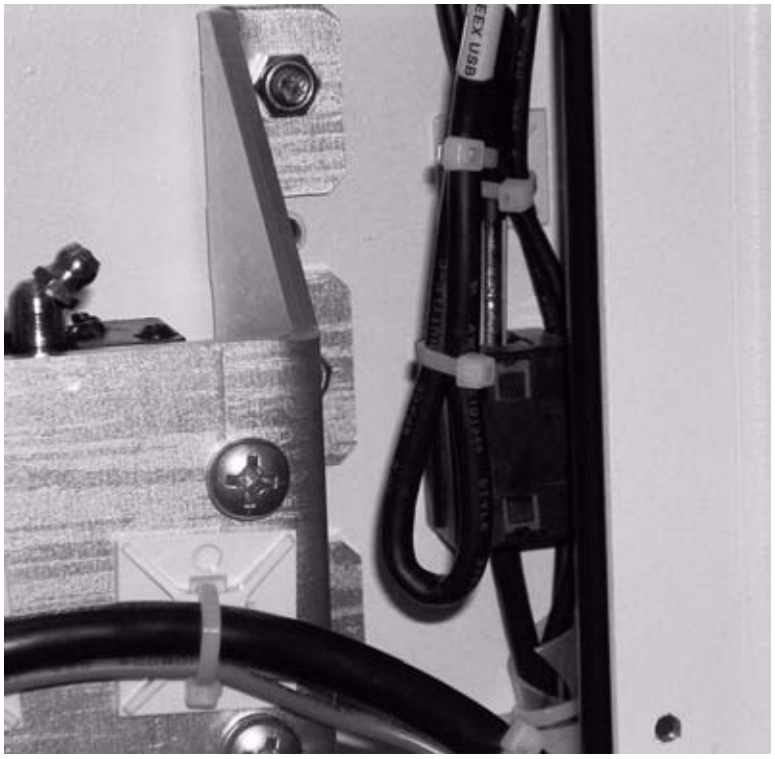


Figure 8-93 USB Power Cable Folded and Fastened with Tie-wraps

11.) Check that the routing procedure has been implemented correctly: lower the cart's top-shelf and make sure that the cables do not interfere with the movement of the cart's top shelf.

NOTE: The movement should be smooth and there must be no pinching of the cables.
Slide the top-shelf up and down a number of times and check that the cables do not disturb the up-down movement of the cart's top-shelf - see Figure 8-94.

Figure 8-94 Fully-raised (left) and Fully-lowered Positions (right)

12.) Return the Upper Rear Cover as described in Service Manual Direction R2423163-100, Revision 3, Chapter 8, section 8-4-3-4.

13) Return the Upper Cover (rear) and Lower Cover (rear) of the SafeLock Cart as described in Upper Cover (Rear) Installation Procedure on page 8 - 73 and Lower Cover (Rear) Installation Procedure on page 8 - 75.

14.) Once more, slide the top-shelf up and down a number of times and check that the movement is smooth and that there is no interference of the cables with the up-down movement of the cart's top-shelf.

15) Proceed to perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
- Chassis Current Leakage Test on page 10 - 24

8-4-8 Main Cable Harness Replacement Procedure

8-4-8-1 Tools

Appropriate Phillips screwdriver and wire cutters.

8-4-8-2 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation.*

Remove the Upper Cover (rear) and Lower Cover (rear) of the SafeLock Cart as described in Upper Cover (Rear) Removal Procedure on page 8 - 73 and Lower Cover (Rear) Removal Procedure on page 8 - 75.

8-4-8-3 Main Cable Harness Removal Procedure

1) Disconnect the Main Cable Harness from the AC Distribution Assembly and free the cable so that it does not interfere with the Gas Spring.
2) Cut any cable ties that secure the cable.
3) Disconnect the P6 cable and USB connector from the USB board, as shown in Figure 8-95.
4) From above the Top Shelf, carefully push the Main Cable Harness Vivid-i™/ Vivid-q™ power supply cable through the top shelf aperture and gently pull it through from below.
5) From below the Top Shelf, carefully push the DVD connectors through the front upper cover.
6) Remove the Main Cable Harness from the cart.

8-4-8-4 Main Cable Harness Installation Procedure

1) From the Upper Assembly (rear), thread the Main Cable Harness Vivid-i™/ Vivid-q™ power supply through the Top Shelf aperture.
2) Thread the Main Cable Harness DVD connectors through the aperture of the Upper Assembly (rear).
3) Wrap the Main Cable Harness once around the Gas Spring and connect the P6 cable and USB connector to the USB board.
4) Connect the Main Cable Harness to the AC Distribution Assembly.
5) Replace all cable ties to secure the Main Cable Harness.
6) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
   - Chassis Current Leakage Test on page 10 - 24

8-4-9 USB Board Replacement Procedure

8-4-9-1 Tools

Appropriate socket wrench

8-4-9-2 Preparation

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-9-3 USB Board Removal Procedure

1) Turn OFF power to the SafeLock Cart and disconnect the AC power cable from the AC input assembly at the base of the cart (rear).
2) Remove the Upper Cover (Rear), as described in the Upper Cover (Rear) Removal Procedure on page 8 - 73.
3) Disconnect the P6 cable and USB connector from the USB board, as shown in Figure 8-95.

Figure 8-95 Removing the USB Box Cover

4) Remove the upper and lower bolts that attach the USB board to the upper frame, as shown in Figure 8-95.
5) Remove the USB board from the SafeLock Cart.

8-4-9-4 USB Board Installation Procedure

1) Return the replacement USB board to its position on the SafeLock Cart chassis and secure it with the upper and lower bolts previously removed - see Figure 8-96.
2) Reconnect the P6 cable to the P6 connector on the USB board.
3) Reconnect the USB cable to the USB board.
4) Return the Upper Cover (Rear), as described in the Upper Cover (Rear) Installation Procedure on page 8 - 73.
5) Reconnect the AC power cable to the AC input assembly at the base of the cart (rear) and turn ON

power to the SafeLock Cart.

6) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
   - Chassis Current Leakage Test on page 10 - 24

8-4-10 Gas Spring Replacement Procedure

8-4-10-1 Tools

Appropriate Phillips screwdrivers, Allen key and open wrench.

8-4-10-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-10-3 Gas Spring Removal Procedure

1) Turn OFF power to the SafeLock Cart and disconnect the AC power cable from the AC input assembly at the base of the cart (rear).
2) Remove the Upper Cover (Rear), as described in the Upper Cover (Rear) Removal Procedure on page 8 - 73.
3) Remove the Lower Cover (Rear), as described in the Lower Cover (Rear) Removal Procedure on page 8 - 75.
4) Disconnect the Main Harness cable from the AC unit, cut both tie clips and free the Main Cable Harness so that it does not interfere with the Gas Spring.
5) Gradually raise the Upper Assembly until the lower Gas Spring securing screw is accessible.
6) Lie the SafeLock cart on its left side with the Gas Spring release handle uppermost.
7) Remove the lower Gas Spring securing screw.

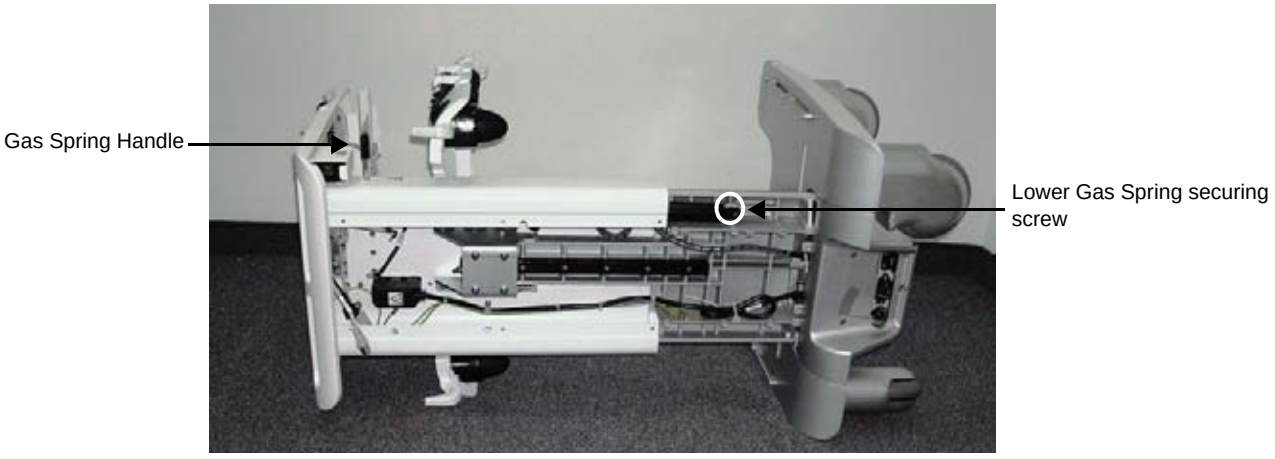


Figure 8-96 SafeLock Cart shown with Gas Spring Handle Uppermost

8) Remove the Gas Spring by turning it counter-clockwise until it is released from the Gas Spring Handle assembly.

NOTE: To remove the Gas Spring handle, unscrew the upper Gas Spring securing screw.

8-4-10-4 Gas Spring Installation Procedure

NOTE: When packed, the Gas Spring replacement part is fully extended. The spring must be compressed prior to installation.

1.) Compress the Gas Spring by pressing downwards on the Gas Spring with its pressure release button pressed against a solid surface until the Gas Spring is full compressed.

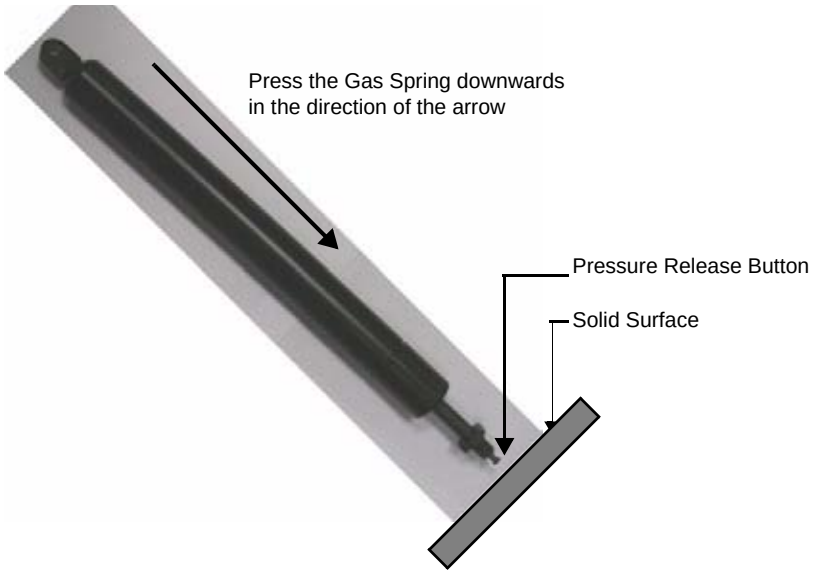


Figure 8-97 Compressing the Gas Spring

2) Turn the Gas Spring locking nut counter-clockwise until it rises about a quarter-way upwards on the thread.
3) Insert the Gas Spring handle into the Gas Spring Housing Assembly until it is flush with the outer cylindrical surface of the housing assembly.

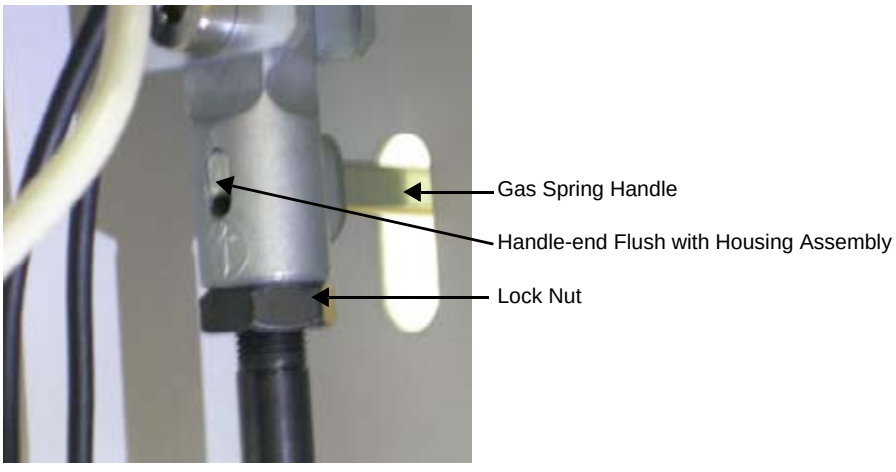


Figure 8-98 Gas Spring Holder Inserted Flush with Housing Assembly

4) Attach the Gas Spring to the housing assembly by turning it clockwise until the locking nut makes contact with the housing assembly - see Figure 8-98.

5) Align the lower Gas Spring connecting bracket with the SafeLock chassis until it is aligned with the screw aperture on the chassis.

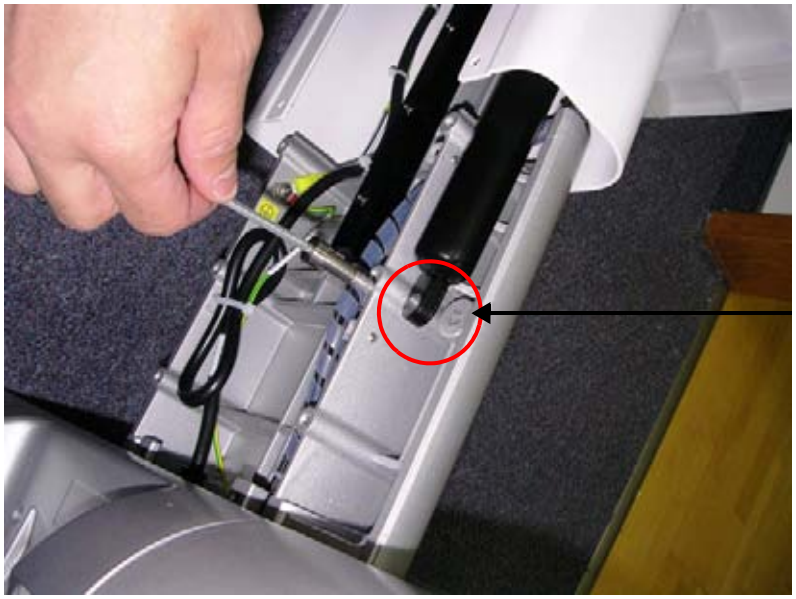


Figure 8-99 Lower Gas Spring Securing Bracket

6) Insert the lower Gas Spring connecting screw and tighten it securely.
7) Replace the Main Harness cable by coiling it once around the Gas Spring and then reconnect it to the AC unit.
8) Secure all cables in position with new cable ties.
9) Return the Lower Cover (Rear), as described in the Lower Cover (Rear) Installation Procedure on page 8 - 75.
10) Return the Upper Cover (Rear), as described in the Upper Cover (Rear) Installation Procedure on page 8 - 73.
11) Proceed to perform the following functionality tests:
    - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
    - Chassis Current Leakage Test on page 10 - 24

8-4-11 DVD Holder Replacement Procedure

8-4-11-1 Tools

Appropriate Phillips screwdriver.

8-4-11-2 DVD Holder Removal Procedure

1.) From below the Top Shelf, while supporting the DVD Holder with one hand, remove the four retaining screws as shown in Figure 8-100.

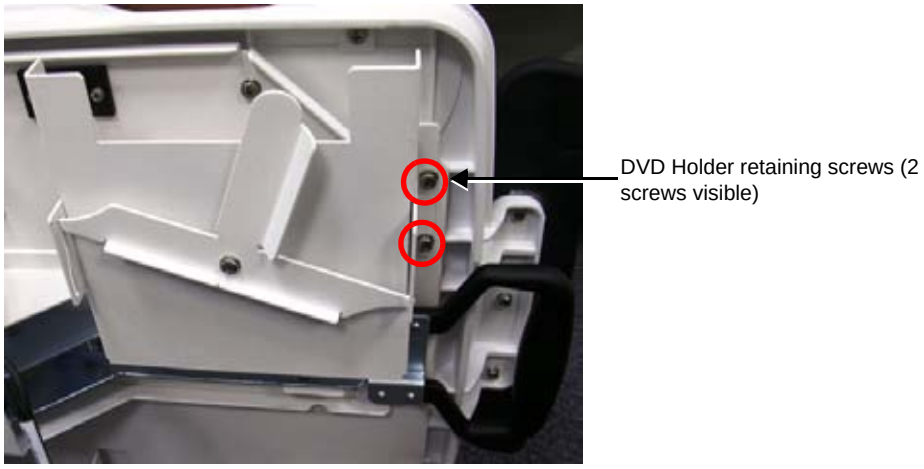


Figure 8-100 DVD Holder Showing Two Retaining Screws

2.) Remove the DVD Holder from the base of the Top Shelf.

8-4-11-3 DVD Holder Installation Procedure

1.) Working from beneath the Top Shelf, align the replacement DVD Holder in the correct position.

2) Return and fasten the four retaining screws as shown in Figure 8-100 to secure the DVD Holder firmly in position.

8-4-12 LAN Isolation Box and Holder Replacement Procedure

8-4-12-1 Tools

Appropriate Phillips screw driver.

8-4-12-2 LAN Isolation Box and Holder Removal Procedure

1) Disconnect the LAN communication cable.
2) From below the Top Shelf, remove the two LAN Holder retaining screws (see Figure 8-101) and remove the LAN Holder.

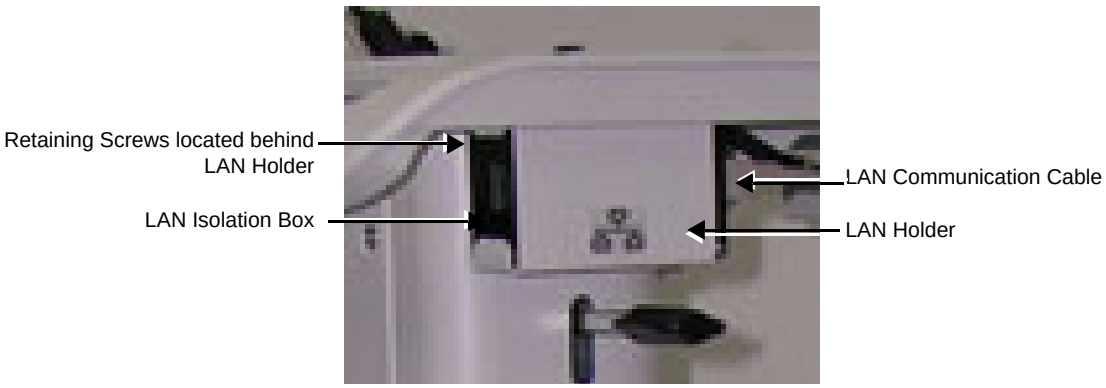


Figure 8-101 LAN Holder and Isolation Box

3) Remove the LAN Isolation Box.

8-4-12-3 LAN Isolation Box and Holder Installation Procedure

1) Position the LAN Isolation Box in the LAN Holder and replace the LAN Holder with the Isolation Box in their appropriate location beneath the Top Shelf.
2) Return and tighten the two retaining screws to secure the LAN Holder.
3) Connect the LAN communication cable.

8-4-13 Top Shelf Replacement Procedure

8-4-13-1 Tools

Appropriate Phillips screwdrivers, Allen key and open wrench.

8-4-13-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-13-3 Top Shelf Removal Procedure

1) Disconnect the AC adapter and all cables from the Vivid-i™/Vivid-q™ portable ultrasound scanner.
2) Disconnect and remove all peripherals from the SafeLock Cart.
3) Remove the Upper Cover (Rear) as described in the Upper Cover (Rear) Removal Procedure on page 8 - 73.
4) Remove the Lower Cover (Rear) as described in the Upper Cover (Rear) Removal Procedure on page 8 - 73.
5) Remove the USB board as described in the USB Board Removal Procedure on page 8 - 84.
6) Remove the gas spring as described in Gas Spring Replacement Procedure on page 8 - 86.
7) Disconnect the two cables (P1 cable and peripheral power cable) from the top of the AC Input Assembly as described in AC Distribution Assembly Removal Procedure on page 8 - 76 (refer to step 6 and step 7).
8) Remove Main Harness, Peripheral power cable and disconnect the LAN cable.
9) Remove the six lower screws that retain the top Shelf - see Figure 8-102.
10) Remove the two rear screws that retain the top Shelf - see Figure 8-103.
11) Carefully remove the top shelf assembly.

Lower screws retaining the Top Shelf - 6 shown

Figure 8-102 Top Shelf - Lower Retaining Screws

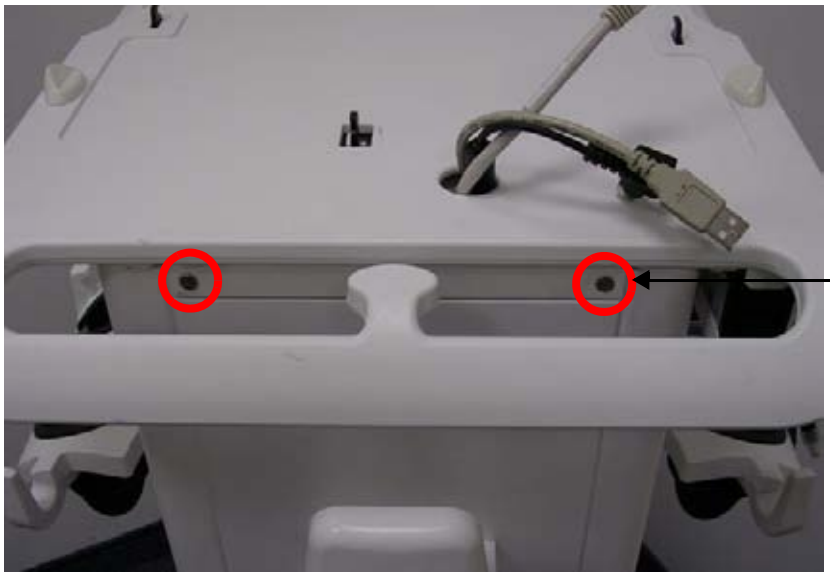


Figure 8-103 Top Shelf - Rear Retaining Screws

8-4-13-4 Top Shelf Installation Procedure

1) Carefully position the Top Shelf on the upper assembly and replace and fasten the rear and lower retaining screws.
2) Replace and reconnect the Main Harness, Peripheral power cable as described in AC Distribution Assembly Installation Procedure on page 8 - 77 and connect the LAN cable.
3) Install the Gas Spring as described in *Gas Spring Removal Procedure* section, page 8-86.
4) Return the USB Box as described in the USB Board Installation Procedure on page 8 - 84.
5) Fasten all cables in position using new cable ties.
6) Return the Lower Cover (Rear) as described in the Lower Cover (Rear) Installation Procedure on page 8 - 75.
7) Return the Upper Cover (Rear) as described in the Upper Cover (Rear) Installation Procedure on page 8 - 73.
8) Reconnect all required peripherals to the SafeLock Cart.
9) Reconnect the AC adapter and all cables to the Vivid-i™/Vivid-q™ portable ultrasound scanner.
10) Proceed to perform the following functionality tests:
    - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
    - Chassis Current Leakage Test on page 10 - 24

8-4-14 Handrest Replacement Procedure

NOTE: If required, the main shelf handrest may be replaced separately, as described below.

8-4-14-1 Tools

Appropriate Phillips screwdrivers.

8-4-14-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit *Chapter 3 - Installation*.

8-4-14-3 Handrest Removal Procedure

1) Remove all peripherals from the Vivid-i™/Vivid-q™ portable ultrasound scanner.
2) Working from the *front* of the SafeLock Cart and below the main shelf, loosen and remove the three screws that secure the handrest to the main shelf - see Figure 8-104 below.

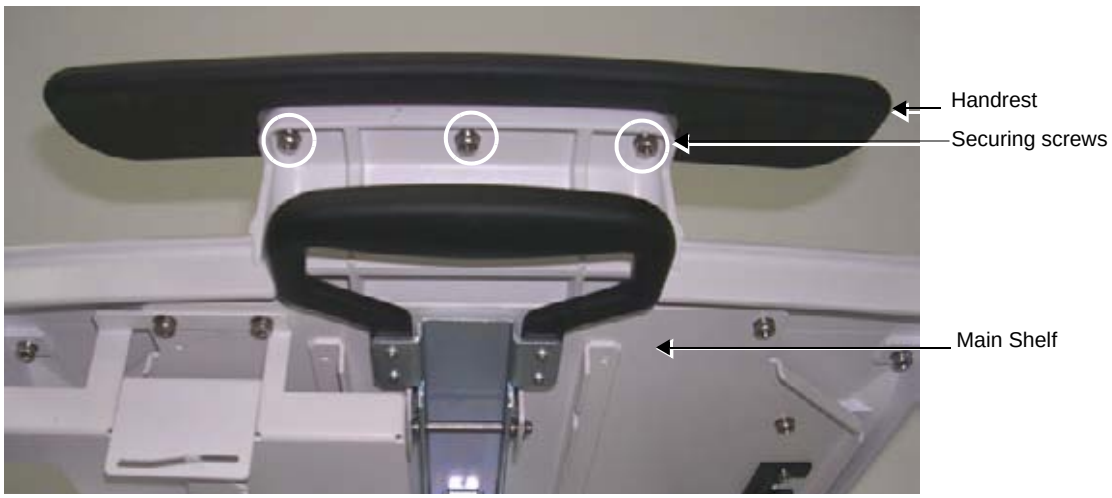


Figure 8-104 Handrest Secured to Main Shelf (viewed from below)

3) Remove the handrest.

8-4-14-4 Handrest Installation Procedure

1) Install a replacement handrest on the SafeLock Cart's main shelf, making sure the three screw holes are aligned correctly.
2) Return and fasten the three screws (previously removed) to secure the handrest in position.

8-4-15 Probe Shelf Assembly Replacement Procedure

NOTE: The probe holders and rails are an integral part of the probe shelf assembly; these components may not be replaced separately.

8-4-15-1 Tools

Appropriate Phillips screw driver.

8-4-15-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit *Chapter 3 - Installation*.

8-4-15-3 Probe Shelf Assembly Removal Procedure

1) Remove all peripherals from the Vivid-i™/Vivid-q™ portable ultrasound scanner.
2) Working from the *front* of the SafeLock Cart and underneath the probe shelf assembly, loosen and remove the two lower screws (highlighted), that secure the shelf in position, Figure 8-105 below.

Figure 8-105 Probe Shelf Assembly - Lower Securing Screws

3) ***While supporting the shelf with one hand***, loosen and remove the two upper screws (one on either side - see Figure 8-106); remove the shelf.

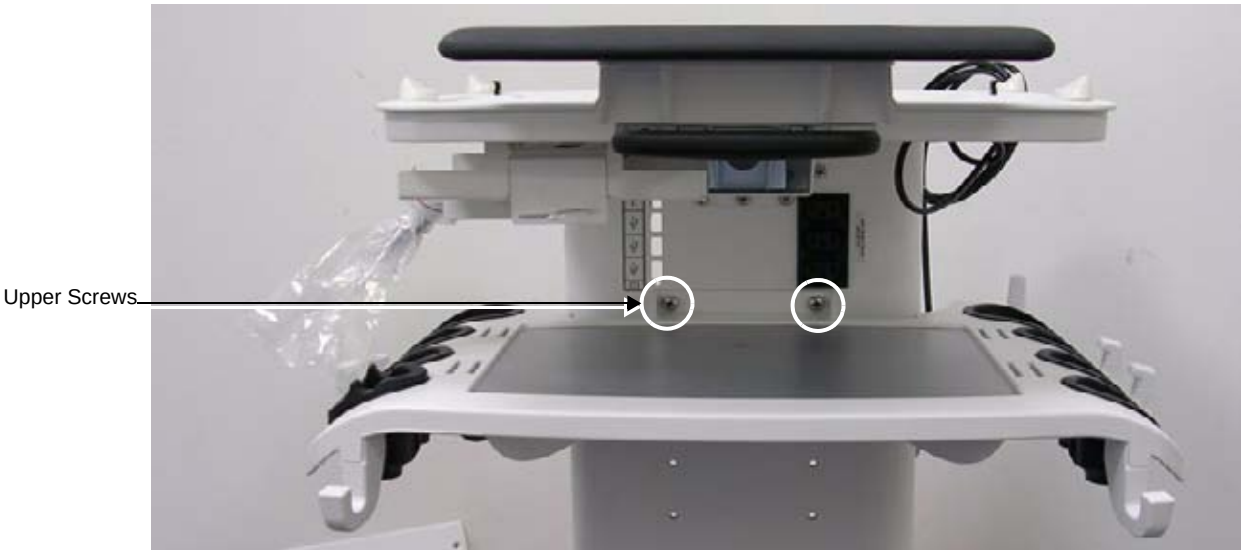


Figure 8-106 Probe Shelf Assembly - Upper Securing Screws

8-4-15-4 Probe Shelf Assembly Installation Procedure

1) Position replacement shelf in the required position on the SafeLock Cart.
2) ***While supporting the shelf with one hand***, return and fasten the two upper screws previously removed.
3) Return and fasten the two lower screws (one on either side), making sure that the shelf is firmly secured in position.
4) Place the required peripheral on the probe shelf assembly.
5) Re-connect all peripherals to the Vivid-i™/Vivid-q™ portable ultrasound scanner.
6) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
   - Chassis Current Leakage Test on page 10 - 24

8-4-16 Probe Cable Hook Replacement Procedure

8-4-16-1 Tools

Appropriate Phillips screwdriver.

8-4-16-2 Probe Cable Hook Removal Procedure

1) From below the Probe Shelf, remove the Probe Cable Hook retaining screw (see Figure 8-107 on page 8-96).
2) Gently pull the Probe Cable Hook upwards to remove it.

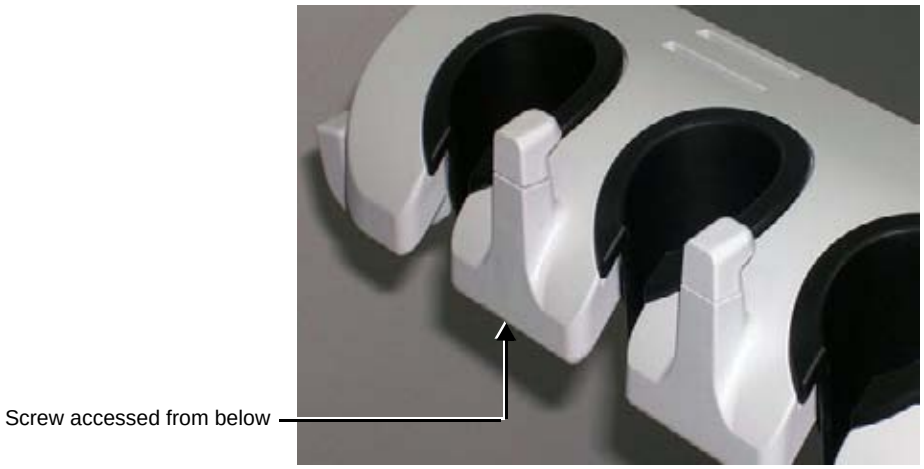


Figure 8-107 Probe Cable Hooks

8-4-16-3 Probe Cable Hook Installation Procedure

1) Insert the Probe Cable Hook in its position on the Probe Shelf.
2) From below, return and replace the Probe Cable Hook retaining screw.

8-4-17 Front Wheel Replacement Procedure

NOTE: This section describes the replacement procedure for a front wheel. The brake on each front wheel is an integral part of the wheel housing.

8-4-17-1 Tools

Appropriate flat screw driver and open wrench.

8-4-17-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-17-3 Front Wheel Removal Procedure

1) Disconnect mains power from the AC adapter.
2) Disconnect the AC adapter and all cables and peripherals from the Vivid-i™/Vivid-q™ portable ultrasound scanner.
3) Remove the Vivid-i™/ Vivid-q™ and all peripherals from the SafeLock Cart.
4) Carefully lay the SafeLock Cart on its back.
5) Loosen and remove the four bolts that secure the front wheel to the SafeLock Cart chassis (see Figure 8-108).

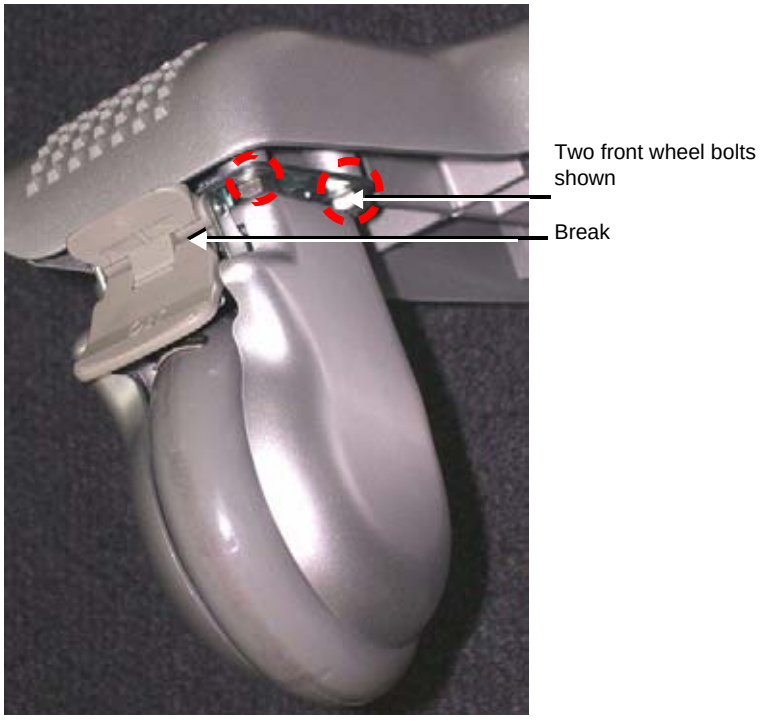


Figure 8-108 Front Wheel Bolted to SafeLock Cart Chassis

6) Remove the wheel from the SafeLock Cart.

8-4-17-4 Front Wheel Installation Procedure

1) Place the new front wheel on the SafeLock Cart chassis in the same position as that of the previously removed wheel.
2) Return and fasten the four bolts previously removed and make sure that wheel is secured firmly to

the chassis.

3) Stand the SafeLock Cart upright.
4) Return the Vivid-i™/ Vivid-q™ and all peripherals to their appropriate positions on the SafeLock Cart.
5) Re-connect the AC adapter and all cables and peripherals to the Vivid-i™/Vivid-q™ portable ultrasound scanner.
6) Re-connect mains power to the AC adapter.
7) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
   - Chassis Current Leakage Test on page 10 - 24

8-4-18 Rear Wheel Replacement Procedure

8-4-18-1 Tools

Appropriate flat screw driver and open wrench.

8-4-18-2 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-4-18-3 Rear Wheel Removal Procedure

1) Disconnect mains power from the AC adapter.
2) Disconnect the AC adapter and all cables and peripherals from the Vivid-i™/Vivid-q™ portable ultrasound scanner.
3) Remove the Vivid-i™/ Vivid-q™ and all peripherals from the SafeLock Cart.
4) Carefully lay the SafeLock Cart on its side.
5) Loosen and remove the four bolts that secure the rear wheel to the SafeLock Cart chassis - see Figure 8-109.

Figure 8-109 Rear Wheel Bolted to SafeLock Cart Chassis

6) Remove the wheel from the SafeLock Cart.

8-4-18-4 Rear Wheel Installation Procedure

1) Place the new rear wheel on the SafeLock Cart chassis in the same position as that of the previously-removed wheel.
2) Return and fasten the four bolts (previously removed - see Figure 8-109) and make sure that wheel is secured firmly to the chassis.
3) Stand the SafeLock Cart upright.
4) Return the Vivid-i™/ Vivid-q™ and all peripherals to their appropriate positions on the SafeLock Cart.

5) Re-connect the AC adapter and all cables and peripherals to the Vivid-i™/Vivid-q™ portable ultrasound scanner.

6) Re-connect mains power to the AC adapter.

7) Proceed to perform the following functionality tests:
   - Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22
   - Chassis Current Leakage Test on page 10 - 24

Section 8-5
Software Loading

8-5-1 Software Upgrade Procedure Overview

NOTICE **IMPORTANT The Software Installation/Upgrade procedure cannot be performed when the Vivid-i™/Vivid-q™ portable ultrasound scanner is mounted on/connected to the SafeLock Cart.**

NOTE: For Vivid-i™/ Vivid-q™ systems, if you are upgrading the system software from version 9.x.x to version 10.x.x, it may be necessary to contact your local OTR department to receive an appropriate software password. Make sure you specify the system serial number located on the base of the Vivid-i™/ Vivid-q™ unit.

NOTE: Vivid-i™ systems cannot be upgraded to any type of Vivid-q™ system.

NOTE: It is recommended to back-up the archive and the settings as described in the Vivid-i™/Vivid-q™ User Manual, before commencing software installation (or whenever upgrading the software).

NOTICE **IMPORTANT** - During software installation, the DVD/CD-RW must be connected directly to the Vivid-i™/Vivid-q™ portable ultrasound scanner and not through the SafeLock Cart or USB outlets.

WARNING: Do not attempt to install software that was not designated for your Vivid-i™ or Vivid-q™ unit. Attempting to install un-approved software will cause irreversible damage to hardware and software!

Normally, the Vivid-i™/ Vivid-q™ system is supplied from the manufacturer with the software already installed. In some cases, it is necessary to re-install the software (for example, after replacing the Back-end Processor) by following the software re-installation procedure shown in Table 8-6 on page 8-109.

Note: If this is a first installation, format the hard disk as described in Formatting and Partitioning the Hard Disk - Manual Procedure on page 8 - 128. When done, perform the software installation procedure described in Table 8-6 on page 8-109.

Refer to the following sub-sections, as appropriate:

- Vivid-i™ Software Upgrade from Version BT10 to BT11 on page 8 - 103
- Vivid-i™/ Vivid-q™ Software Re-Installation Procedure on page 8 - 109
- Setting the BIOS on page 8 - 113
- BIOS Firmware Update on page 8 - 123
- Formatting and Partitioning the Hard Disk - Automatic Procedure on page 8 - 126
- Formatting and Partitioning the Hard Disk - Manual Procedure on page 8 - 128
- Full Re-ghost and Software Installation on page 8 - 132
- Installing Software only from DVD on page 8 - 134
- Installing Software only or Patch on page 8 - 138
- Installation of PMC Version on page 8 - 139

- Software Roll-back Procedure on page 8 - 143

8-5-1-1 Vivid-i™ Software Upgrade from Version BT10 to BT11

If the Vivid-i™/ Vivid-q™ system is currently running a software version lower than ver. 9.1.0 Build 66, then perform the software upgrade procedure as described in FMI 78060.

NOTE: The PMC software is automatically updated with the system upgrade.

NOTE: Vivid-i™ systems cannot be upgraded to any type of Vivid-q™ systems.

NOTE: The Vivid-i™/ Vivid-q™ BT10 to BT11 upgrade software can only be purchased by the customer through the Sales Dept, using the appropriate ordering number (HCat #), as listed in Table 8-3.

Table 8-3 Software BT10 to BT11 Upgrade - Ordering Number

HCat #	Description
H45032BF	Vi/q German Upgr BT11
H45032BG	Vi/q Italian Upgr BT11
H45032BH	Vi/q Spanish Upgr BT11
H45032BJ	Vi/q Spanish LA Upgr BT11
H45032BK	Vi/q Portuguese Upgr BT11
H45032BL	Vi/q Brazilian Upgr BT11
H45032BM	Vi/q Japanese Upgr BT11
H45032BN	Vi/q Chinese Upgr BT11
H45032BP	Vi/q Finish Upgr BT11
H45032BR	Vi/q Dutch Upgr BT11
H45032BS	Vi/q Greek Upgr BT11
H45032BT	Vi/q Norwegian Upgr BT11
H45032BW	Vi/q Polish Upgr BT11
H45032BX	Vi/q Russian Upgr BT11
H45032BY	Vi/q Swedish Upgr BT11
H45032BZ	Vi/q Danish Upgr BT11
H45032CA	Vi/q Hungarian Upgr BT11
H45032CB	Vi/q Czech Upgr BT11
H45032CC	Vi/q Lithuanian Upgr BT11
H45032CD	Vi/q Latvian Upgr BT11
H45032CE	Vi/q Slovakian Upgr BT11
H45032CF	Vi/q Romanian Upgr BT11

Table 8-3 Software BT10 to BT11 Upgrade - Ordering Number (cont'd)

HCat #	Description
H45032CG	Vi/q Bulgarian Upgr BT11
H45032CH	Vi/q Serbian Upgr BT11
H45032CJ	Vi/q Korean Upgr BT11
H45032CK	Vi/q Estonian Upgr BT11
H45032CL	Vi/q Hebrew Upgr BT11
H45032CM	Vi/q Croatian Upgr BT11
H45032CN	Vi/q Slovenian Upgr BT11
H45032CP	Vi/q English Upgr BT11
H45032CR	Vi/q French Upgr BT11

The V i/q Language Upgrade kit, P/N H45031XX, (where XX refers to the language code) consists of the items shown in Table 8-4 below:

Table 8-4 Upgrade Kit (P/N H45031XX) Contents[a]

Part Number	Description
5400907-XXX	User Manual Vivid-i/q BT11 — while XXX represents a language
R2424516	File For User Manual - A5 size
5402226-XXX	Vi,q BT11 Release Note — while XXX represent a language
5395700	Doc CD BT11 Vivid-i,q
5398988	Vi,q Sys.SW 4.0.16, Appl.SW 11.0.0 Build 11-BT11 M2 DVD
R2424579	Vivid-i/q BT10 to BT11 Upgrade Label

a. The Vivid-i™/ Vivid-q™ Release Note is also provided with the Upgrade Kit and in the DOC CD

NOTE:Following the software upgrade, an Application Specialist visit is recommended. Until an Application Specialist has visited the site, it is recommended that only the factory default presets be used.

NOTE: After performing an upgrade, all logs are deleted. It is recommended that these should be recorded should they be needed in the future.

8-5-1-1-1 Preparation

NOTE: Make sure that the required Software Option Keys are available prior to the upgrade process.

When performing this procedure, backup of the archive is not necessary as this upgrade does not tamper with or affect the patient archive (database). However, it is recommended that the Backup procedure be performed on regular basis.

At the site, perform the following steps before you start the upgrade procedure:

1.) Perform Disk Management for all database records and select the "Copy" option (for instructions, refer to the Vivid-i™/ Vivid-q™ User Manual on your document CD).

2.) Perform a full back-up for Patient Archive and System Configuration (for instructions, refer to the Vivid-i™/ Vivid-q™ User Manual on your document CD).

3.) Write down the following Connectivity settings as it will be necessary to restore them at the end of the process:

- TCP/IP address
- Network printer (if present)
- Wireless network settings (if present)
- Trackball speed
- InSite ExC settings

NOTE: The following upgrade procedure is based on the Vivid-q™ system. The procedure is the same as for the Vivid-i™ system.

8-5-1-1-2 Vivid-i™/ Vivid-q™ Software Upgrade Procedure - BT10 to BT11

Table 8-5 Step-by-Step Vivid-i™/ Vivid-q™ Software Upgrade Procedure

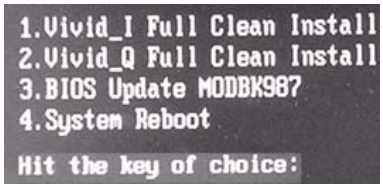
Step	Instruction	Expected Result
1.	Perform a complete shutdown of the system.	
2.	Eject the battery and remove all peripherals currently connected to the system, with the following exceptions: Make sure no peripherals are connected to the USB connectors except the DVD and the PCMCIA.	
3.	If not already connected, connect the DVD\CD-RW to the USB port at the rear of the system and connect power to the DVD\CD-RW drive.	
4.	Press the <Eject> button of the DVD\CD-RW drive to verify that no disc is present in the disk drive.	
5.	Insert the DVD containing the full software version (P/N Rxxxxx) into the DVD-RW drive and close the tray.	The DVD\CD-RW drive tray will load the software.
6.	On the console, hold down the <ON/OFF> button for three seconds.	The system powers ON and when system boot-up from the DVD is complete, the following message is displayed prompting you to select the required option: 

Table 8-5 Step-by-Step Vivid-i™/ Vivid-q™ Software Upgrade Procedure (cont'd)

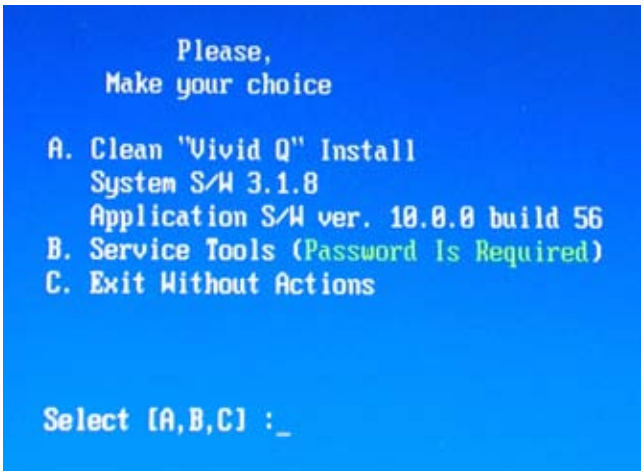
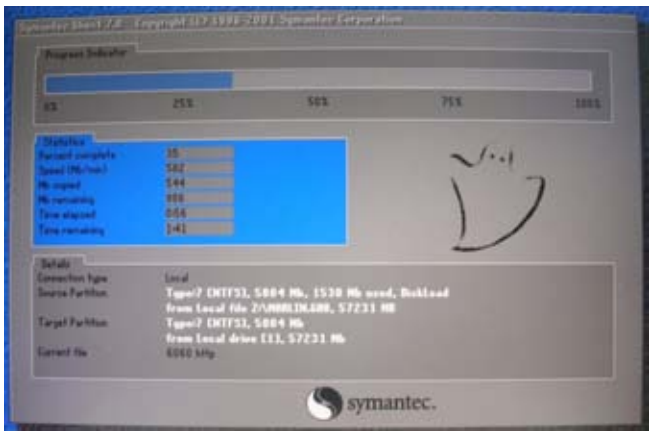
Step	Instruction	Expected Result
7.	Select option **1**. **Vivid_q Full Clean Install (System + Application Software**)	Wait until the following message is displayed, prompting you to select the required option: 
8.	Select option **A**. **Clean "Vivid q" Install System S/W ...**	The user is prompted for a password.
9.	When prompted, type the following password: **geulsservice** and press <**Enter**>. **Note**: When typing the password, use lower-case letters.	A message is displayed showing the current system ID. The DVD then begins the software installation process and a progress indicator is displayed, as shown below:  This stage of the process takes approximately 5 mins. **Note**: Do not stop the software installation operation during this process! At the end of the re-ghosting process, a message is displayed on-screen prompting you to press <Eject> and remove the CD, then to press <CTRL + ALT + DELETE> to reboot the system.
10.	Press <Eject> and remove the CD. Press <CTRL+ALT+DELETE>.	The Ghosting process continues for approximately 10 minutes. The system automatically loads the application and the system is ready for software option installation.
11.	Install software options as described in Chapter 3, section 3-7-5 on page 3-90.	

Table 8-5 Step-by-Step Vivid-i™/ Vivid-q™ Software Upgrade Procedure (cont'd)

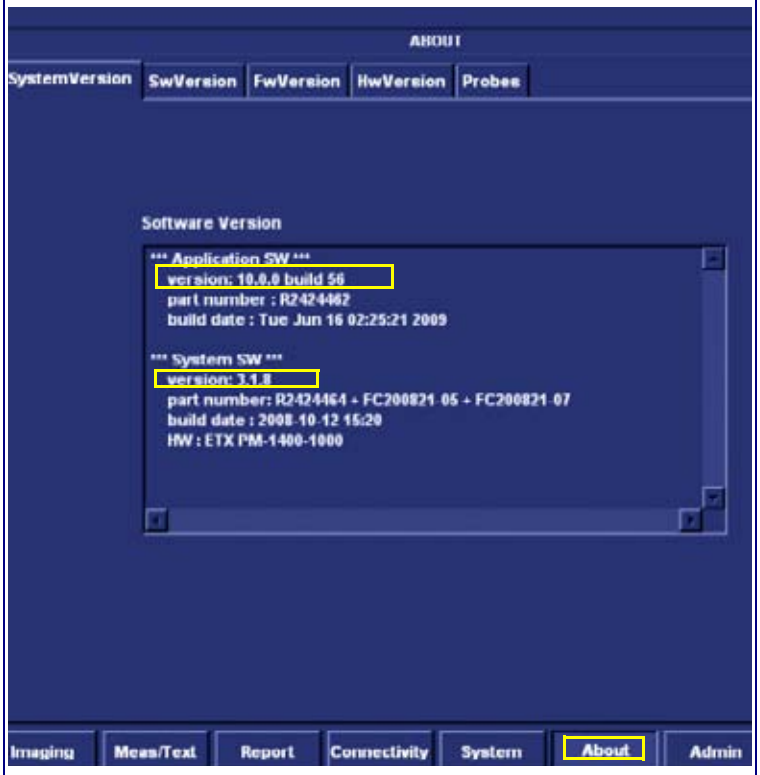
Step	Instruction	Expected Result
12.	To verify the software version, press **Config.**	The About screen opens, and from the System Version tab, the installed software version is displayed on the screen 
13.	Verify that the software version corresponds with the System SW version and that it was correctly installed.	
14.	Restore all Presets as per user manual. **Note:** When performing "Restore", select "System Configuration" and then de-select "GSP Resources".	
15.	Install security patch as required.	
16.	Install peripherals.	

Table 8-5 Step-by-Step Vivid-i™/ Vivid-q™ Software Upgrade Procedure (cont'd)

Step	Instruction	Expected Result
17.	Restore the settings as recorded under Preparation section 8-5-1-1-1 on page 8-105. Verify proper Connectivity functionality - refer to Connectivity Setup on page 3 - 92.	
18.	Proceed to perform the following functionality tests: • Software Configuration Checks on page 4 - 39 • Calibration Tests on page 7 - 25 • Full System Test on page 7 - 10	

8-5-1-2 Vivid-i™/ Vivid-q™ Software Re-Installation Procedure

Table 8-6 Vivid-i™/ Vivid-q™ Software Re-Installation

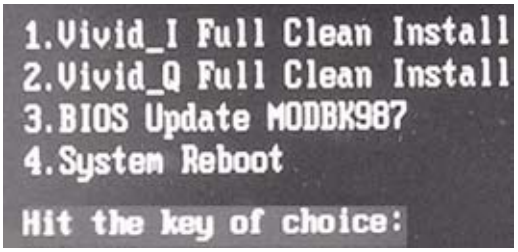
Step	Instruction	Expected Result
1.	Eject the battery and remove all peripherals currently connected to the system, with the following exceptions: Make sure no peripherals are connected to the USB connectors except the DVD and the PCMCIA.	
2.	Press the <Eject> button of the DVD\CD-RW drive and remove any media if present.	
3.	Insert the CD provided with the software kit into the DVD\CD-RW.	The DVD\CD-RW drive loads the software CD.
4.	Hold down the <ON/OFF> button for 5 seconds to shutdown the system.	The shutdown options are displayed on-screen.
5.	Select **Full Shutdown**.	The system powers down.
6.	Hold down the <ON/OFF> button for three seconds.	The system powers ON and when system boot-up from the CD is complete, the following message is displayed prompting you to select the required option: 
7.	Select option 1. **Vivid_i Full Clean Install (System + Application Software**)	Wait until the following message is displayed, prompting you to select the required option:
8.	Select option A. **Clean "Vivid i" Install System S/W ...**	The user is prompted for a password.

Table 8-6 Vivid-i™/ Vivid-q™ Software Re-Installation (cont'd)

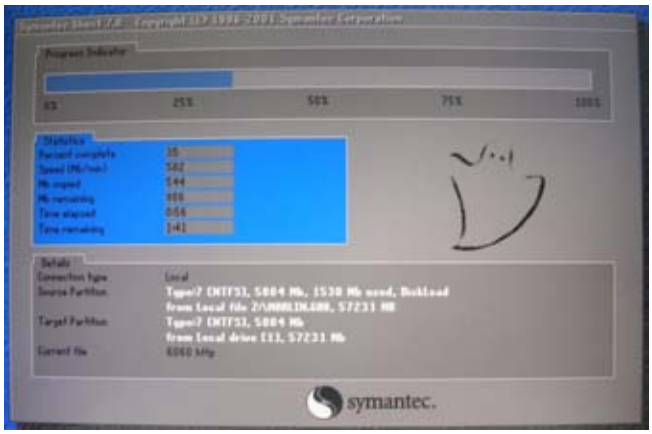
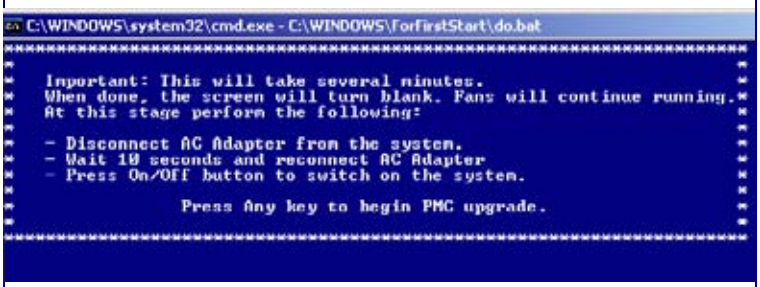
Step	Instruction	Expected Result
9.	When prompted, type the following password: **geulsservice** and press <**Enter**>. Note: when typing the password, use lower-case letters.	A message is displayed showing the current system ID. The CD then begins the software installation process and a progress indicator is displayed, as shown below:  This stage of the process takes approximately 5 mins. A message is then displayed on-screen prompting you to press <Eject> and remove the CD, then to press <CTRL + ALT + DELETE> to reboot the system.
10.	Press <Eject> and remove the CD. Press <CTRL+ALT+DELETE>.	The system re-boots.
11.	Follow the instructions on the screen, clicking **OK** (or Cancel) when prompted.	The machine performs a number of reboots before completing the installation. As the installation proceeds, the system displays various installation screens. The installation process will take approximately 15 minutes - ***DO NOT ATTEMPT TO STOP THE INSTALLATION BEFORE COMPLETION!***
		When done, the following PMC Firmware upgrade message is displayed:
12.	Move cursor over the displayed window and press the SET button.	The following message is displayed 

Table 8-6 Vivid-i™/ Vivid-q™ Software Re-Installation (cont'd)

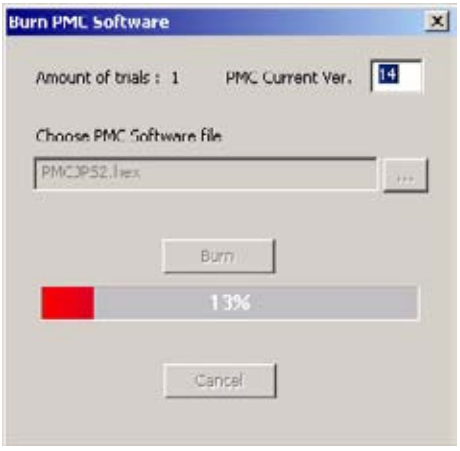
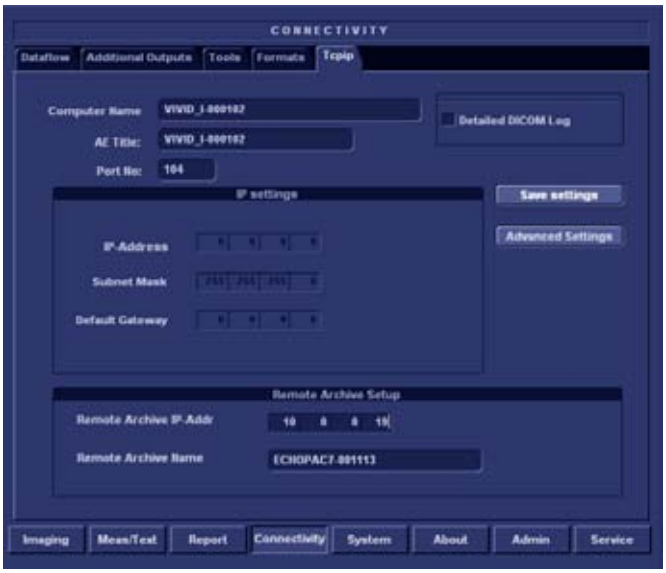
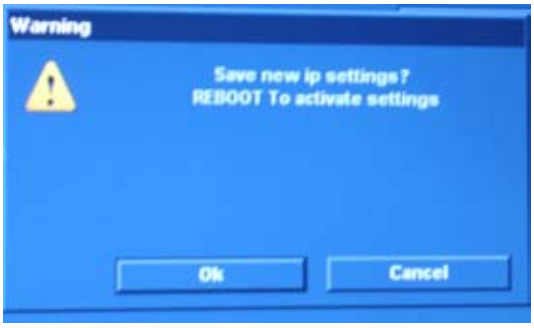
Step	Instruction	Expected Result
13.	Press any key to begin the PMC upgrade.	The PMC upgrade commences and the following screen with current PMC version and colored progress bar is displayed:  Note: If this screen fails to appear, refer to Installation of PMC Version on page 8 - 139. When done (after several minutes), the screen will turn blank and the fans will continue running.
14.	Power down the system by removing the AC adapter from the rear of the system. Wait 10 seconds, then re-connect the battery and the AC adapter. Boot-up the system by pressing the On/Off button.	If this is a new installation, the system will prompt for the software licence Password, as shown below. Proceed to step 15. If not a new installation, there is no prompt for the software licence Password and the boot-up screen is displayed (see below). Proceed to step 16.
15.	Type the password provided for the specific software and approve by clicking **OK**.	The system will continue to boot-up into *Normal Scanning* mode:
16.	From the System Configuration window, click the **Connectivity** tab at the bottom of the window.	The Connectivity dialog box opens.

Table 8-6 Vivid-i™/ Vivid-q™ Software Re-Installation (cont'd)

Step	Instruction	Expected Result
17.	Navigate to the **TCPIP** tab and press the **Set** button on the control panel.	Connectivity dialog box - TCPIP tab activated: 
18.	Navigate to the **Save Settings** button and press the **Set** button on the control panel.	A message is displayed prompting for system re-boot: 
19.	Click **OK** to re-boot the system.	When the installation process is complete, the system will re-boot in regular display mode (Probe Select Screen). Note: If this is a new software version, an adhesive Rating Plate is supplied with the software CD. Adhere the plate in the appropriate position under the Bottom Assembly.
20.	Proceed to perform the following functionality tests: • Software Configuration Checks on page 4 - 39 • Calibration Tests on page 7 - 25 • Full System Test on page 7 - 10	

8-5-2 Setting the BIOS

NOTE: This procedure is applicable to both MODBR949 and MODBR929 versions.

1) While booting, press F2 “Config / Diag” on alphanumeric keyboard
2) Type the password “**marlin04**”.
3) Exit and save presets.
4) Select <Exit> section and load “Setup Defaults”.
5) Select <Main> section.

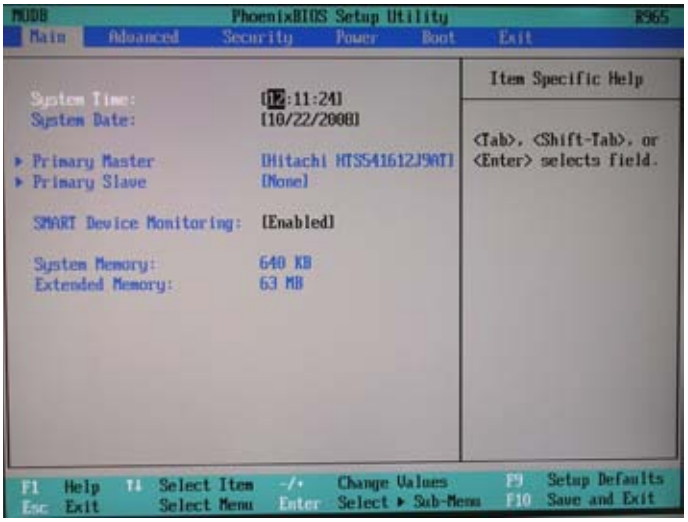


Figure 8-110 BIOS Main Tab

6) Set correct System Time and System Date. Set Date using next format MM/DD/YYYY
7) Check that IDE Primary Master is detected.
8.) Proceed to Setting the BIOS Advanced Parameters on page 8 - 114.

8-5-2-1 Setting the BIOS Advanced Parameters

This sections details how the BIOS parameters should be configured. The table below lists the parameters that are shown in this section.

BIOS Parameter	Corresponding Figure
Chipset Control	Figure 8-112 on page 8-115
PCI/PNP Configuration	Figure 8-113 on page 8-115
Memory Cache	Figure 8-115 on page 8-116
I/O Device Configuration	Figure 8-115 on page 8-116
Keyboard Features	Figure 8-116 on page 8-117
Hardware Monitor	Figure 8-117 on page 8-117
Watchdog Settings	Figure 8-118 on page 8-118
Display Control	Figure 8-119 on page 8-118
Miscellaneous	Figure 8-120 on page 8-119

1.) From the BIOS main menu (see Figure 8-110), select the **<Advanced>** menu and press **<Enter>**.

Advanced Chipset Control is highlighted.

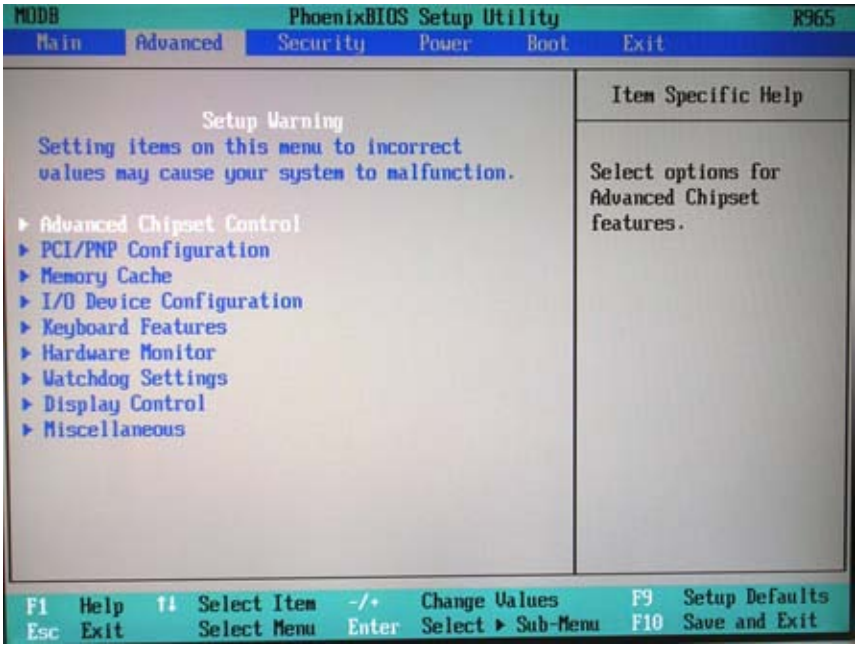


Figure 8-111 BIOS Advanced Parameters Screen

2) Press **<Enter>** to access **Advanced Chipset Control (**Figure 8-112**)**.

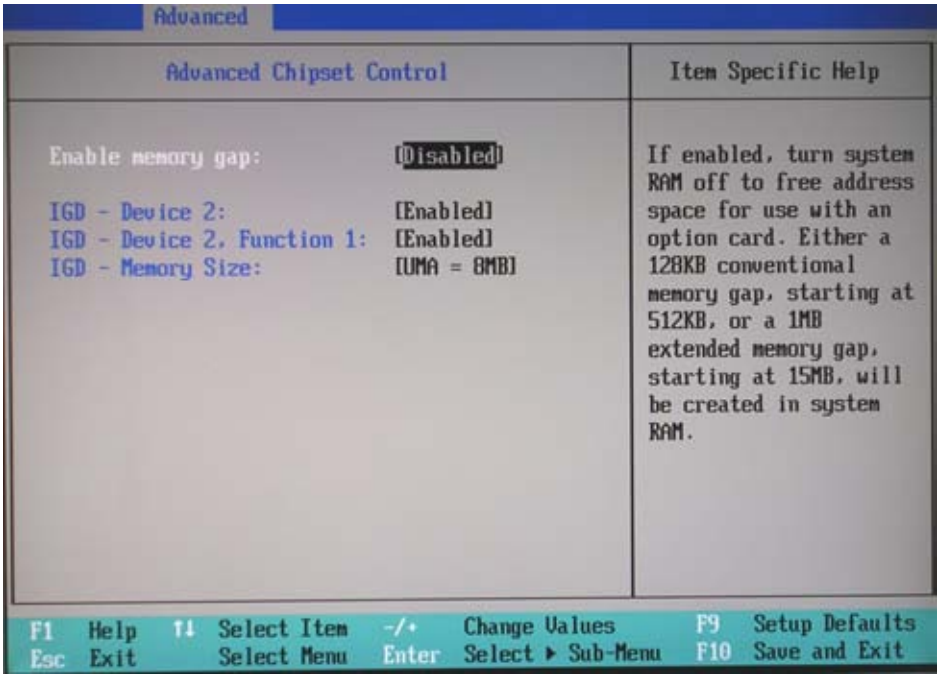

Advanced
Advanced Chipset Control
Item Specific Help
Enable memory gap: [Disabled]
IGD - Device 2: [Enabled]
IGD - Device 2, Function 1: [Enabled]
IGD - Memory Size: [UMA = 8MB]
If enabled, turn system RAM off to free address space for use with an option card. Either a 128KB conventional memory gap, starting at 512KB, or a 1MB extended memory gap, starting at 15MB, will be created in system RAM.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-112 BIOS Advanced Chipset Control Parameters

3.) Set the parameters for **Enable memory gap:** as shown above in Figure 8-112.

4.) Press <**Esc**> to return to the **Advanced** menu home screen (Figure 8-111).

5.) Scroll to **PCI/PNP Configuration** and press **<Enter>** to open the **PCI/PNP Configuration** screen.

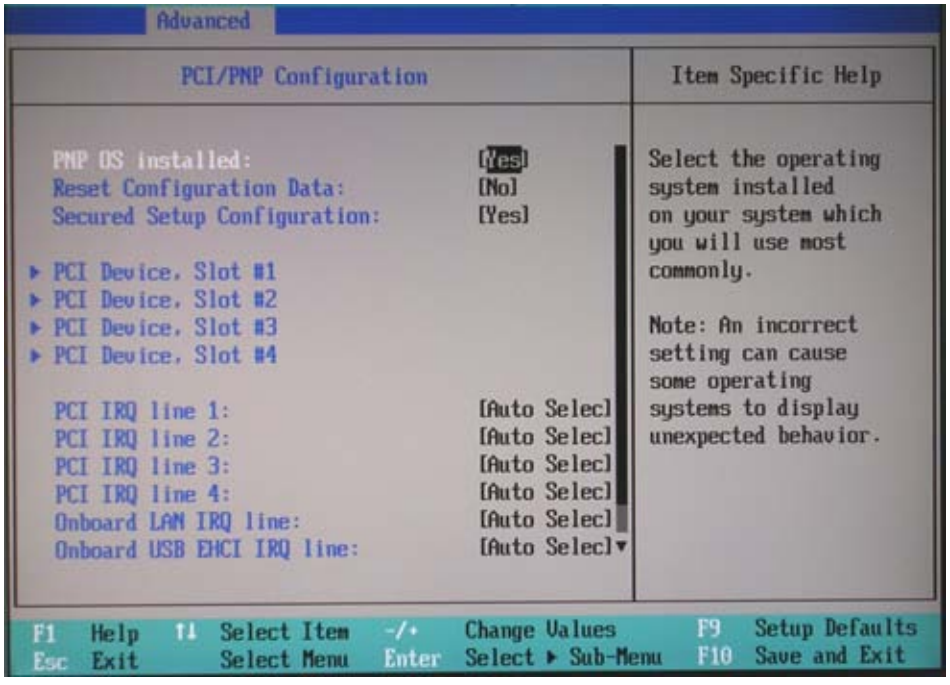

Advanced
PCI/PNP Configuration
Item Specific Help
PNP OS installed: [Yes]
Reset Configuration Data: [No]
Secured Setup Configuration: [Yes]
▸ PCI Device, Slot #1
▸ PCI Device, Slot #2
▸ PCI Device, Slot #3
▸ PCI Device, Slot #4
PCI IRQ line 1: [Auto Selec]
PCI IRQ line 2: [Auto Selec]
PCI IRQ line 3: [Auto Selec]
PCI IRQ line 4: [Auto Selec]
Onboard LAN IRQ line: [Auto Selec]
Onboard USB EHCI IRQ line: [Auto Selec]
Select the operating system installed on your system which you will use most commonly.
Note: An incorrect setting can cause some operating systems to display unexpected behavior.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-113 BIOS Advanced PCI/PNP Parameters

6.) Set the parameters in the **PCI/PNP Configuration** screen as shown above in Figure 8-113.

7.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

8.) Scroll to **Memory Cache** and press **<Enter>** to open the **Memory Cache** screen.

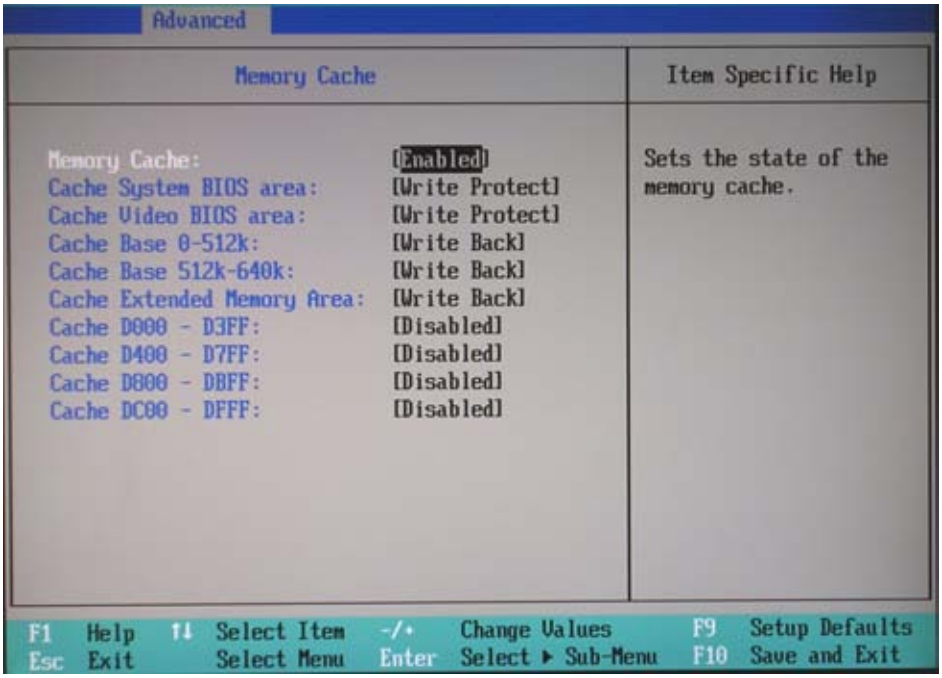

Advanced
Memory Cache
Item Specific Help
Memory Cache: [Enabled]
Cache System BIOS area: [Write Protect]
Cache Video BIOS area: [Write Protect]
Cache Base 0-512k: [Write Back]
Cache Base 512k-640k: [Write Back]
Cache Extended Memory Area: [Write Back]
Cache D000 - D3FF: [Disabled]
Cache D400 - D7FF: [Disabled]
Cache D800 - DBFF: [Disabled]
Cache DC00 - DFFF: [Disabled]
Sets the state of the memory cache.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-114 BIOS Advanced Memory Cache Parameters

9.) Set the parameters in the **Memory Cache** screen as shown above in Figure 8-114.

10.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

11.) Scroll to **I/O Device Configuration** and press **<Enter>** to open the **I/O Device Configuration** screen.

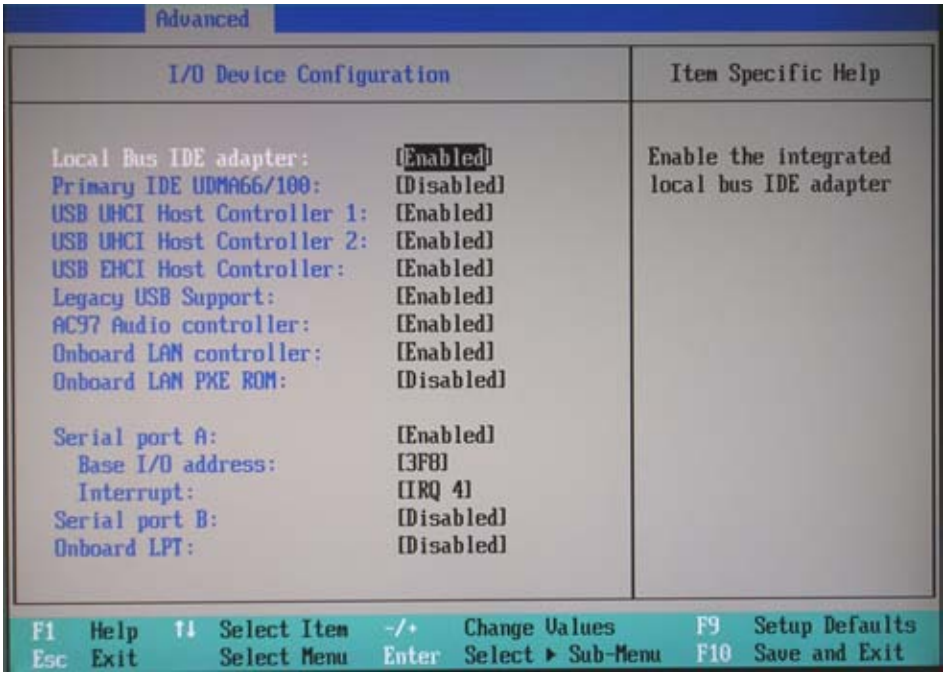

Advanced
I/O Device Configuration
Item Specific Help
Local Bus IDE adapter: [Enabled]
Primary IDE UDMA66/100: [Disabled]
USB UHCI Host Controller 1: [Enabled]
USB UHCI Host Controller 2: [Enabled]
USB EHCI Host Controller: [Enabled]
Legacy USB Support: [Enabled]
AC97 Audio controller: [Enabled]
Onboard LAN controller: [Enabled]
Onboard LAN PXE ROM: [Disabled]
Serial port A: [Enabled]
Base I/O address: [3F8]
Interrupt: [IRQ 4]
Serial port B: [Disabled]
Onboard LPT: [Disabled]
Enable the integrated local bus IDE adapter
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-115 BIOS Advanced I/O Device Configuration Parameters

12.) Set the parameters in the **I/O Device Configuration** screen as shown above in Figure 8-115.

13.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

14.) Scroll to **Keyboard Features** and press **<Enter>** to open the **Keyboard Features** screen.

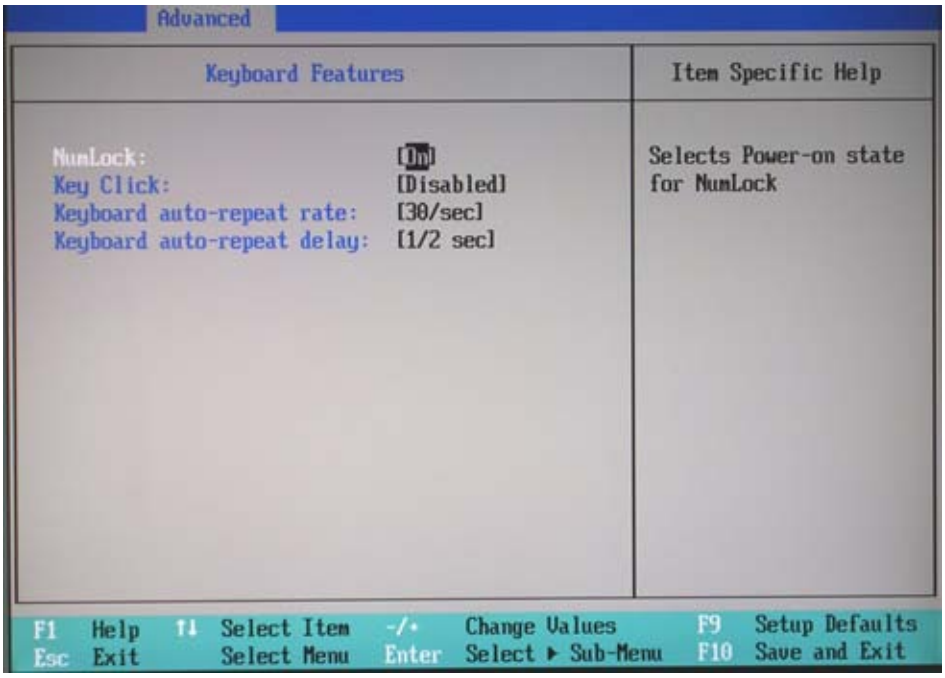

Advanced
Keyboard Features
Item Specific Help
NumLock: [On]
Key Click: [Disabled]
Keyboard auto-repeat rate: [30/sec]
Keyboard auto-repeat delay: [1/2 sec]
Selects Power-on state for NumLock
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-116 BIOS Advanced Keyboard Features Parameters

15.) Set the parameters in the **Keyboard Features** screen as shown above in Figure 8-116.

16.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

17.) Scroll to **Hardware Monitor** and press **<Enter>** to open the **Hardware Monitor** screen.

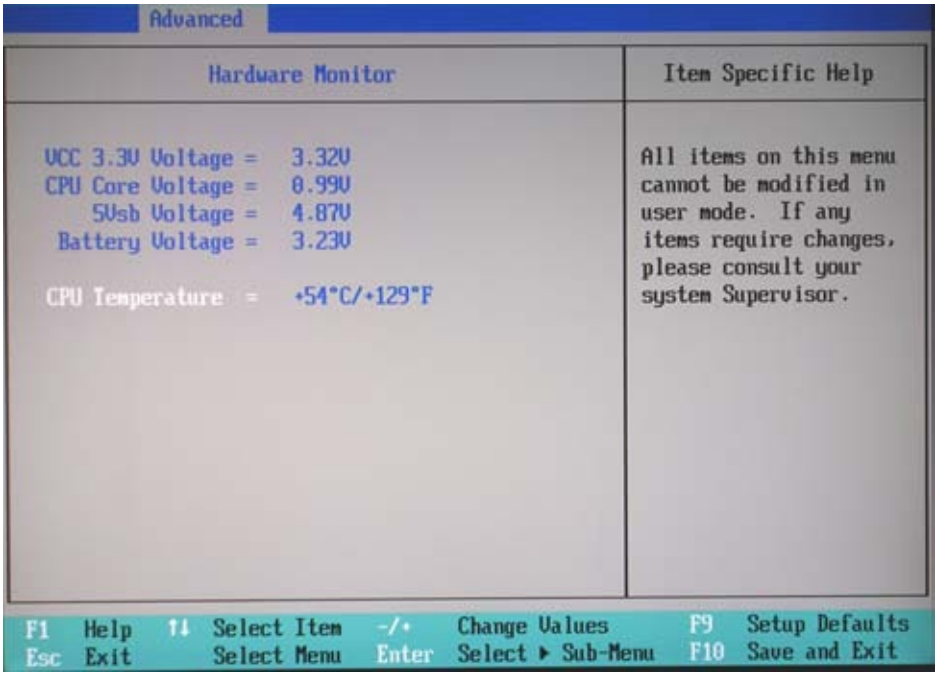

Advanced
Hardware Monitor
Item Specific Help
VCC 3.3V Voltage = 3.32V
CPU Core Voltage = 0.99V
5Vsb Voltage = 4.87V
Battery Voltage = 3.23V
CPU Temperature = +54°C/+129°F
All items on this menu cannot be modified in user mode. If any items require changes, please consult your system Supervisor.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-117 BIOS Advanced Hardware Monitor Parameters

18.) Set the parameters in the **Hardware Monitor** screen as shown above in Figure 8-117.

19.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

20.) Scroll to **Watchdog Settings** and press **<Enter>** to open the **Watchdog Settings** screen.

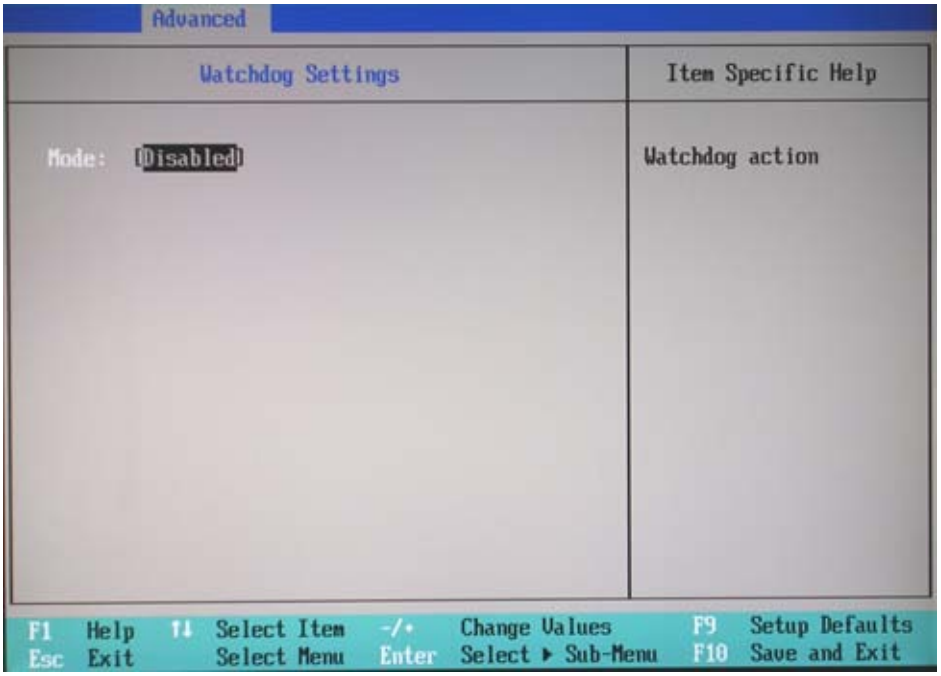

Advanced
Watchdog Settings
Item Specific Help
Mode: [Disabled]
Watchdog action
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-118 BIOS Advanced Watchdog Settings

21.) Set the parameters in the **Watchdog S**ettings as shown above in Figure 8-118.

22.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

23.) Scroll to **Display Control** and press **<Enter>** to open the **Display Control** screen.

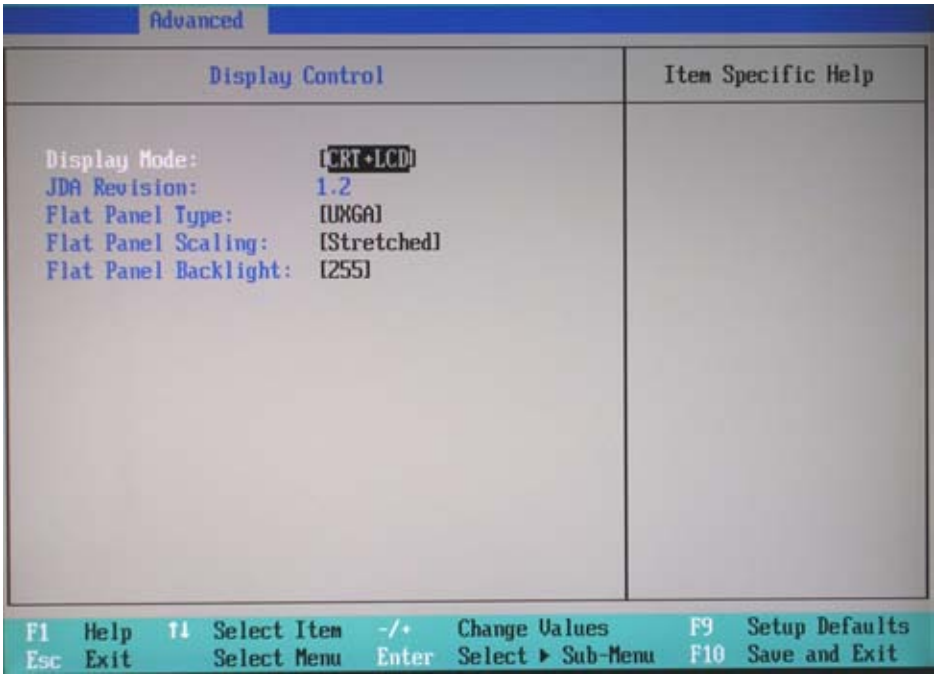

Advanced
Display Control
Item Specific Help
Display Mode: [CRT+LCD]
JDA Revision: 1.2
Flat Panel Type: [UXGA]
Flat Panel Scaling: [Stretched]
Flat Panel Backlight: [255]
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-119 BIOS Advanced Display Control Parameters

24.) Set the parameters in the **Display Control** screen as shown above in Figure 8-119.

25.) Press <**Esc>** to return to the **Advanced** menu home screen (Figure 8-111).

26.) Scroll to **Miscellaneous** and press **<Enter>** to open the **Miscellaneous** screen.

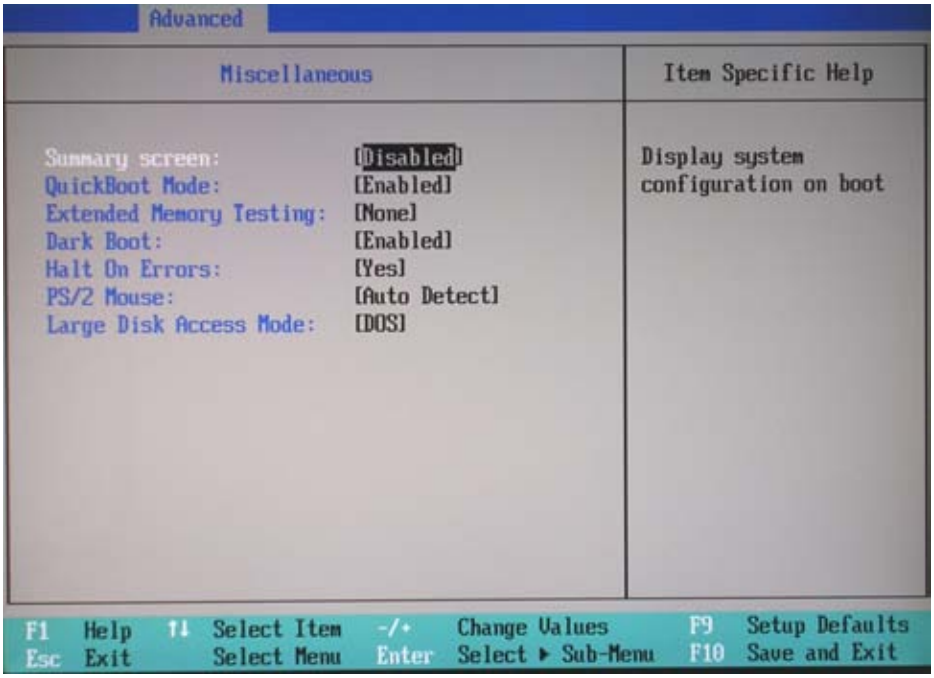

Advanced
Miscellaneous
Item Specific Help
Summary screen: [Disabled]
QuickBoot Mode: [Enabled]
Extended Memory Testing: [None]
Dark Boot: [Enabled]
Halt On Errors: [Yes]
PS/2 Mouse: [Auto Detect]
Large Disk Access Mode: [DOS]
Display system configuration on boot
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Figure 8-120 BIOS Advanced Miscellaneous Parameters

27.) Set the parameters in the **Miscellaneous** screen as shown above in Figure 8-120.

28.) Proceed to Additional BIOS Settings on page 8 - 120.

8-5-2-2 Additional BIOS Settings

This section details how additional BIOS parameters should be configured. The table below lists the parameters that are shown in this section.

BIOS Parameter	Corresponding Figure
Security	Figure 8-121 on page 8-120
Power	Figure 8-122 on page 8-121
Boot	Figure 8-123 on page 8-121

1.) From the BIOS main menu (see Figure 8-110), select the **<Advanced>** menu and press **<Enter>**.

2.) Select the **<Security>** menu and press **<Enter>**.

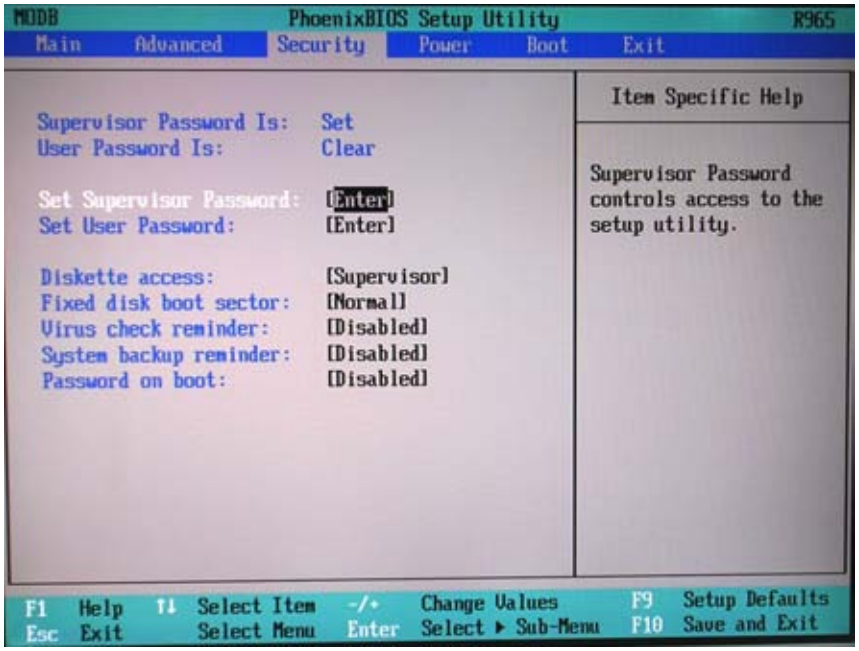


Figure 8-121 BIOS Security Parameters

3.) Set the parameters in the **Security** screen as shown above in Figure 8-121.

4.) Press <**Esc>** to return to the main BIOS screen (Figure 8-110 on page 8-113).

5.) Select the **<Power>** menu and press **<Enter>.**

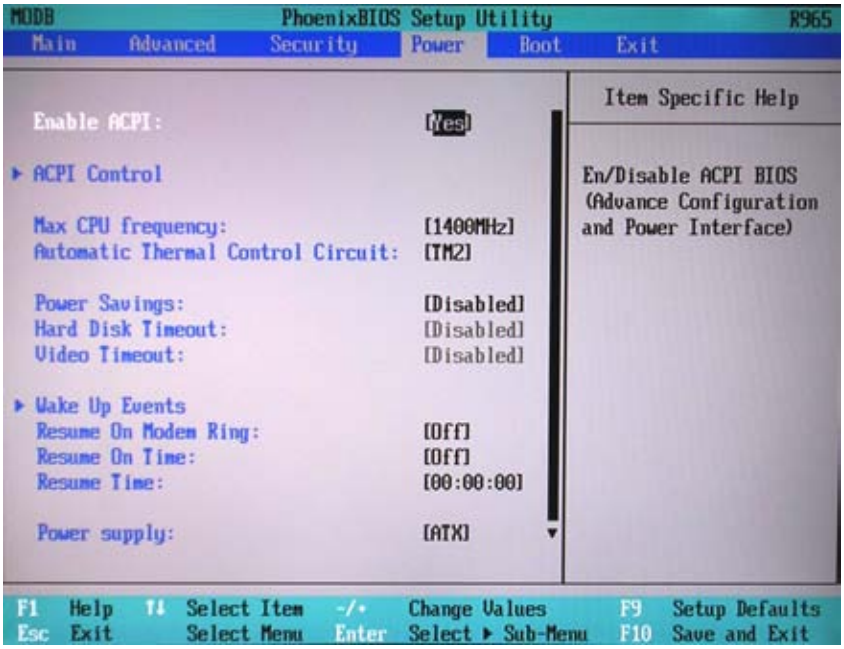

MODB PhoenixBIOS Setup Utility R965
Main Advanced Security Power Boot Exit
Item Specific Help
Enable ACPI: [Yes]
▶ ACPI Control
En/Disable ACPI BIOS (Advance Configuration and Power Interface)
Max CPU frequency: [1400MHz]
Automatic Thermal Control Circuit: [TM2]
Power Savings: [Disabled]
Hard Disk Timeout: [Disabled]
Video Timeout: [Disabled]
▶ Wake Up Events
Resume On Modem Ring: [Off]
Resume On Time: [Off]
Resume Time: [00:00:00]
Power supply: [ATX]
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Figure 8-122 BIOS Power Parameters

6.) Set the parameters in the **Power** screen as shown above in Figure 8-122.

7.) Press <**Esc>** to return to the main BIOS screen (Figure 8-110 on page 8-113).

8.) Select the **<Boot>** menu and press **<Enter>.**

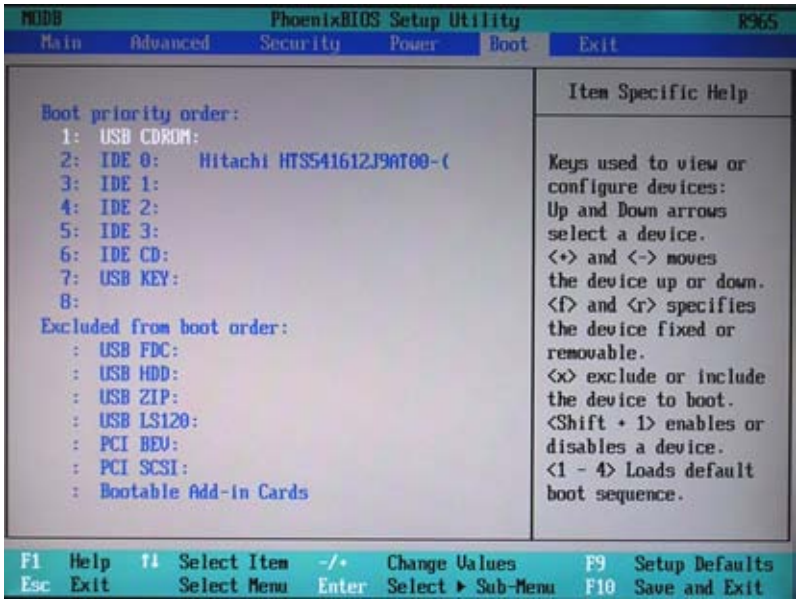

MODB PhoenixBIOS Setup Utility R965
Main Advanced Security Power Boot Exit
Item Specific Help
Boot priority order:
1: USB CDROM:
2: IDE 0: Hitachi HTS541612J9AT00-(
3: IDE 1:
4: IDE 2:
5: IDE 3:
6: IDE CD:
7: USB KEY:
8:
Excluded from boot order:
: USB FDC:
: USB HDD:
: USB ZIP:
: USB LS120:
: PCI BEV:
: PCI SCSI:
: Bootable Add-in Cards
Keys used to view or configure devices:
Up and Down arrows select a device.
<+> and <-> moves the device up or down.
<f> and <r> specifies the device fixed or removable.
<x> exclude or include the device to boot.
<Shift + 1> enables or disables a device.
<1 - 4> Loads default boot sequence.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Figure 8-123 BIOS Boot Parameters

9.) Set the parameters in the **Boot** parameters screen as shown above in Figure 8-123.

10.) Press <**Esc>** to return to the main BIOS screen (Figure 8-110 on page 8-113).

11) Press **<F10>** to **Exit Saving Changes** as shown in Figure 8-124.

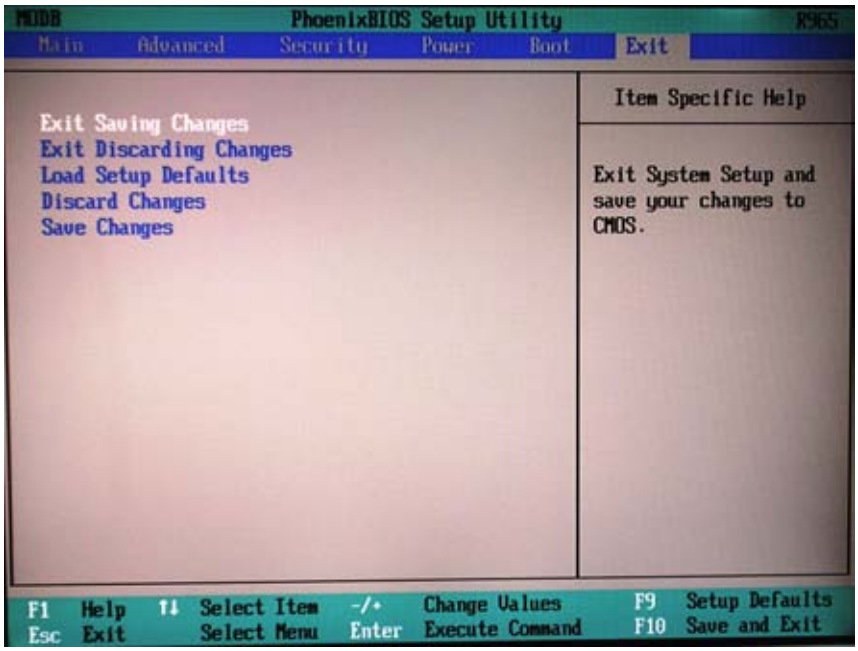


Figure 8-124 BIOS Exit Screen

12.) Reboot the system and check that the Supervisor PASSWORD was installed properly.

13.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-5-3 BIOS Firmware Update

WARNING: When performing this procedure, it is strongly recommended that both AC power and battery power be available to the Vivid-i™/ Vivid-q™ scanner to prevent causing problems in the Back End in the event of AC power fluctuation or power failure.

In addition, BIOS Firmware Update is a sensitive procedure; allow the process to run to completion without interruption. *Failure to do this could result in unrecoverable damage to the system!*

1) Make sure the Vivid-i™/ Vivid-q™ scanner is connected to both battery and AC power.
2) Insert the Vivid-i™/ Vivid-q™ software installation CD in the DVD\CD-R and close the tray.
3) Hold down the ON/OFF button on the control console for 3 seconds.

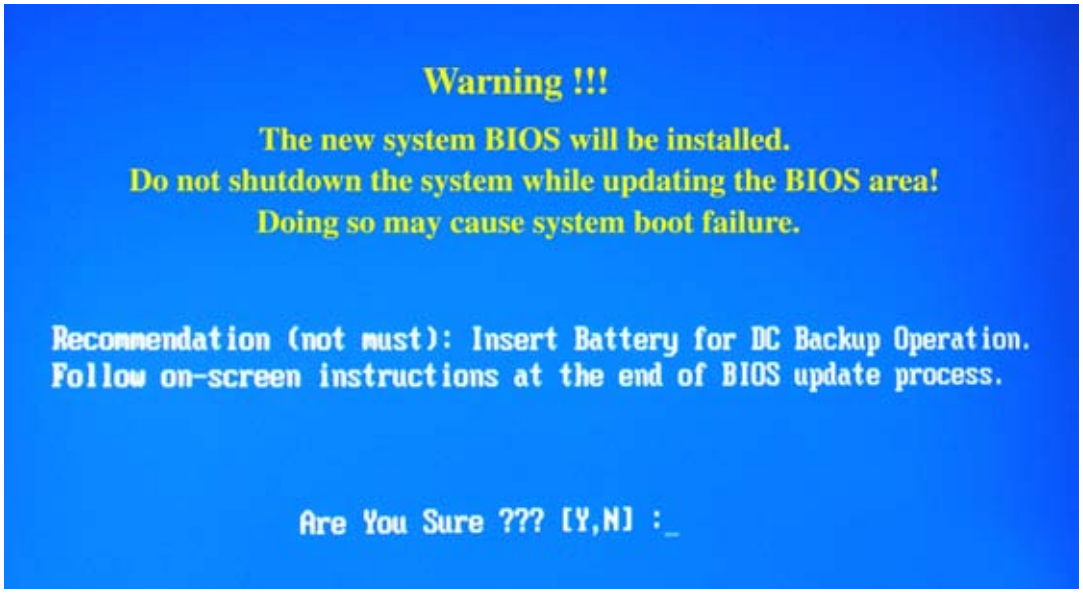
   The system powers ON and when system boot-up from the CD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

4) Select option: **3: BIOS Update MODBR949**

   A prompt for password is displayed:

5) Type **geulsservice** and press <**Enter**>.

   *The following screen opens displaying a flashing **Warning** message not to shutdown the system during this procedure*:


Warning !!!
The new system BIOS will be installed.
Do not shutdown the system while updating the BIOS area!
Doing so may cause system boot failure.
Recommendation (not must): Insert Battery for DC Backup Operation.
Follow on-screen instructions at the end of BIOS update process.
Are You Sure ??? [Y,N] :_

Note: use of the battery for DC backup during this procedure is also recommended in this screen.

6) To continue, type **Y**.

The following screen is displayed, showing the progress of the BIOS update process:

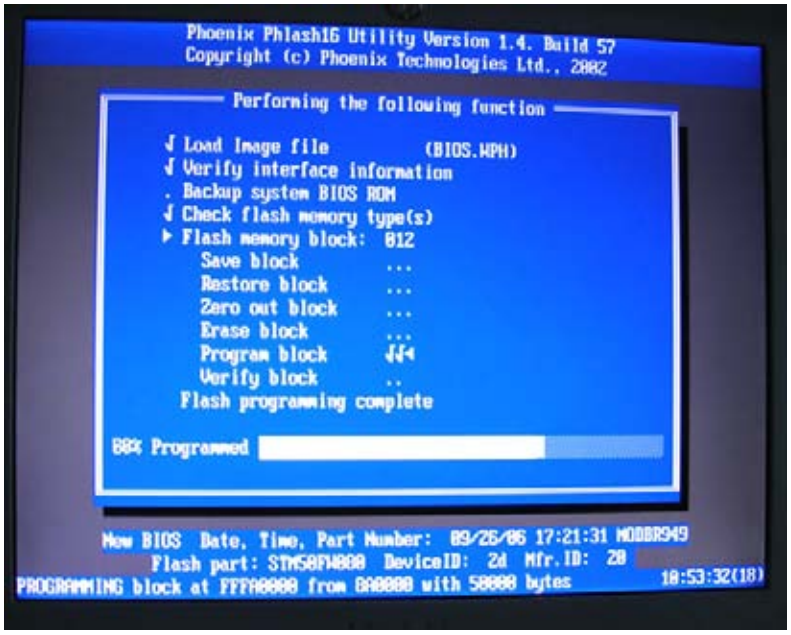

Phoenix Phlash16 Utility Version 1.4. Build 57
Copyright (c) Phoenix Technologies Ltd., 2002
Performing the following function
√ Load Image file (BIOS.WPH)
√ Verify interface information
. Backup system BIOS ROM
√ Check flash memory type(s)
▸ Flash memory block: 812
Save block ...
Restore block ...
Zero out block ...
Erase block ...
Program block √√√
Verify block ..
Flash programming complete
68% Programmed
New BIOS Date, Time, Part Number: 09/26/06 17:21:31 M00BR949
Flash part: STM58FW800 DeviceID: 2d Mfr.ID: 20
PROGRAMMING block at FFFA0000 from 0A0000 with 50000 bytes
18:53:32(18)

Figure 8-125 BIOS Update in Progress

When the BIOS Update process is complete, the following message is displayed:

Phoenix Phlash16 Utility Version 1.4. Build 57
Phoenix Phlash16 Status
Flash memory has been successfully programmed
PRESS ANY KEY TO RESTART THE SYSTEM
If the system does not restart
TURN THE POWER OFF, THEN ON

7) Press any key to restart the system.

The boot-up screen is displayed, as shown in Figure 8-126 on page 8-125.

Note: If the system does not restart, turn the power OFF, then ON. (In the event that the system boot-up screen is not displayed, repeat the procedure, from step 1).

Figure 8-126 Boot-up Screen after Completion of BIOS Update

8.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-5-4 Formatting and Partitioning the Hard Disk - Automatic Procedure

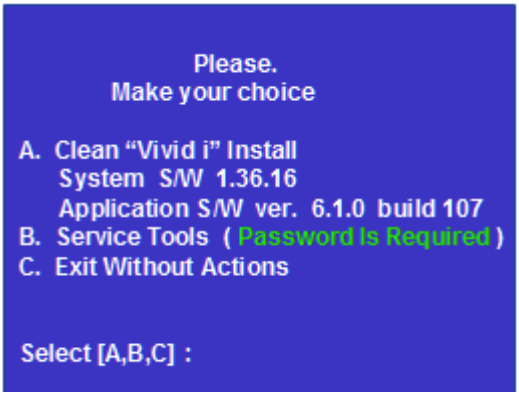
If partition C:\ has been stored by using the Rollback tool described in the Software Roll-back Procedure (see page 8-143), it will be DELETED after performing the following procedure.

1) Connect the DVD\CD-RW drive to the system's USB and connect the power supply of the drive to power outlet.
2) Place the GHOST CD inside the DVD\CD-RW Tray and close tray.
3) Turn ON power to the system and allow it to boot up from the CD.

   A menu will appear prompting for selection of one of four options:

4) Select option: **1: Vivid_i Full Clean Install (System + Application Software**)

   A menu will appear prompting for selection of the required option:


Please.
Make your choice
A. Clean "Vivid i" Install
System S/W 1.36.16
Application S/W ver. 6.1.0 build 107
B. Service Tools (Password Is Required)
C. Exit Without Actions
Select [A,B,C] :

5) Select "**B**" service tools.
6) Type in the password "**geulsservice**" and press <**Enter**>.

   A menu will appear prompting for selection of one of seven options:

Tools:
A. Format Hard Disk BT86
B. Format Hard Disk BT89
C. Write / Read / Check System ID
D. PC-Doctor Test Program
E. Save Partition "C:\" To Image
F. Restore Partition "C:\" From Image
H. Exit To Main Menu
Select [A,B,C,D,E,F,H] :_

7) Select "**A**" (for BT06 systems) or "**B**" (for BT09 systems) to format and re-partition the complete hard disk.

Note: The system will partition the hard disk as follows:
C: = 5GB
D: = 5GB
F: = 1GB
E: = Remaining space (i.e. complete hard-disk size *minus* 11GB for partitions C, D, and F).

IMPORTANT: ***Do not stop the operation during this process!***

8) When complete, continue with the software installation procedure. Refer to the relevant section.

Note: In the event that the above process fails, one can perform the hard-disk partitioning procedure manually, as described below.

9.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-5-5 Formatting and Partitioning the Hard Disk - Manual Procedure

If partition C:\ has been stored by using the Rollback tool described in the Software Roll-back Procedure (see page 8-143), it will be DELETED after performing the following procedure.

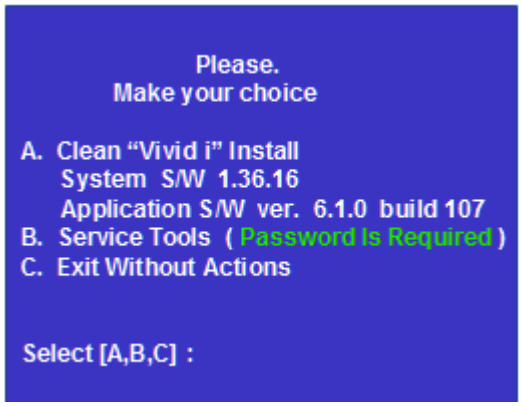
1) Insert the Vivid-i™/ Vivid-q™ software installation CD in the DVD\CD-R and close the tray.

2) Hold down the ON/OFF button on the control console for 3 seconds.

   The system powers ON and when system boot-up from the CD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

3) Select option: **1: Vivid_i Full Clean Install (System + Application Software**)

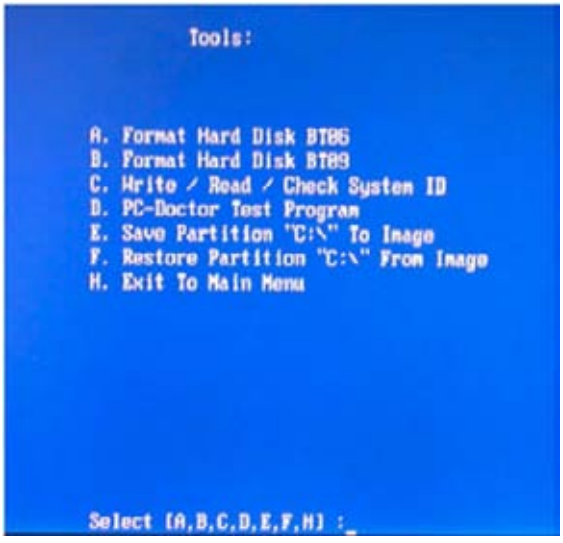
   A menu will appear prompting for selection of the required option:


Please.
Make your choice
A. Clean "Vivid i" Install
System S/W 1.36.16
Application S/W ver. 6.1.0 build 107
B. Service Tools (Password Is Required)
C. Exit Without Actions
Select [A,B,C] :

4) Select option **B Service Tools**.

5) When prompted for the password, type **geulsservice** and press <**Enter**>.

   The message "*Loading Tools please wait*" is displayed, then the *Service Tools Options* menu opens:


Tools:
A. Format Hard Disk BT86
B. Format Hard Disk BT89
C. Write / Read / Check System ID
D. PC-Doctor Test Program
E. Save Partition "C:\" To Image
F. Restore Partition "C:\" From Image
H. Exit To Main Menu
Select [A,B,C,D,E,F,H] :_

6) Do not select an option, but press **<Ctrl> + C**.

7) When the message *"EMM386 is running. Available memory is limited to 32MB*" is displayed, click **OK**.

8) When the message "*Terminate batch job (Y/N?)*" is displayed, type **Y**.

9) At the prompt A:\> type **pqmagic** and press <**Enter**>.

   The *Partition Magic* Screen is displayed, as shown below.

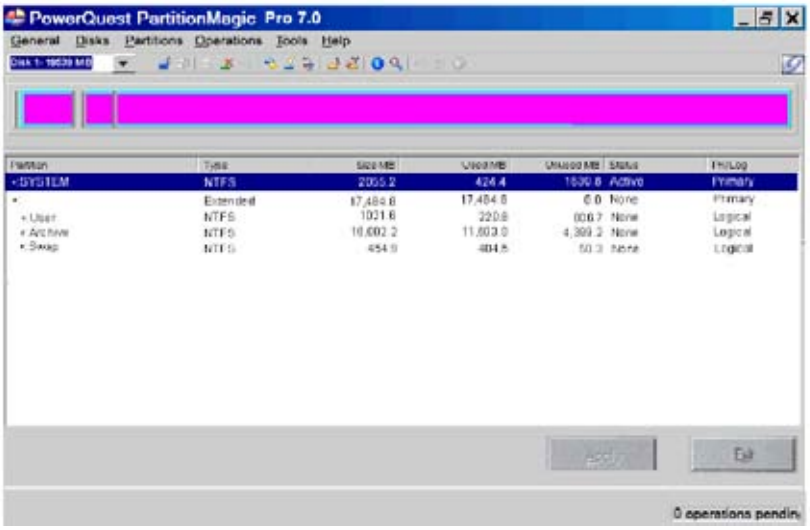


Figure 8-127 Partition Magic Screen

10) With the *System* partition selected (highlighted, as shown in Figure 8-127), delete the partition by selecting the **Delete** Tool under the *Operations* menu, as shown in Figure 8-128 below:

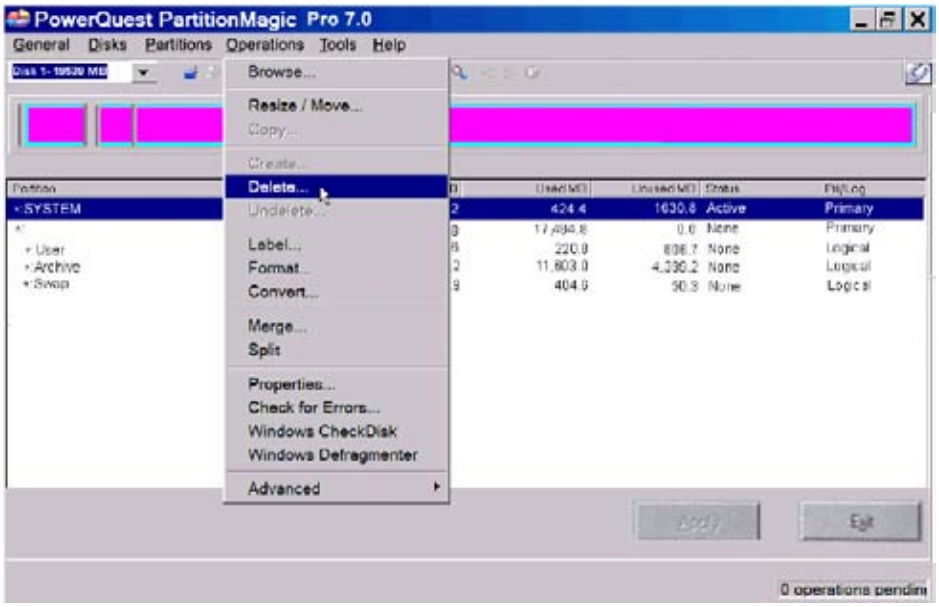


Figure 8-128 Operations Menu

11) When prompted for confirmation of the deletion, click **OK**.

12) Repeat step 10 and step 11 to select and delete each of the remaining partitions in turn, including the partition type *Extended*.

    The non-partitioned hard disk will now be shown on the Partition Magic Screen with all disk space listed as *Unallocated* (for example, 19,594.9 MB).

13) With *Unallocated* selected (highlighted), create the first partition by selecting the **Create** Tool under the *Operations* menu, as shown below:

14) In the dialog box displayed, select the following:

    Partition: **Primary Partition**

    Partition Type: **NTFS**

15) Type the Label as: **SYSTEM**

16) Type the size required. This should be at least 3GB (up to 4GB).

17) Activate the **Beginning of Unallocated** checkbox.

18) When done, click **OK**.

    The System partition and allocated space is now listed in the *Partition Magic Screen*.

19) With the System partition selected (highlighted), select the **Advanced Tool** under the *Operations* menu.

20) In the dialog box displayed, click **Set Active**, then click **OK**.

21) When the message "*Are you sure you want to change the active partition?"* is displayed, click **OK**.

22) With **Unallocated** selected in the *Partition Magic Screen*, repeat step 15 and step 16 to create the next partition, using the following:

    Partition: **Logical Partition**

    Partition Type: **NTFS**

23) Type the Label as: **USER**

24) Type the size required. This should be at least 5GB (up to 6GB).

25) Activate the **Next Unallocated** checkbox.

26) When done, click **OK**.

The User partition and allocated space is now listed in the *Partition Magic Screen*.

27) With **Unallocated** selected in the *Partition Magic Screen*, repeat step 15 and step 16 to create the next partition, using the following:

Partition: **Logical Partition**

Partition Type: **NTFS**

28) Type the Label as: **SWAP**

29) Type the size required. This should be 1/2 to 1GB - for example, 1022.6.

30) Activate the **End of Unallocated** check box, then click **OK**.

The Swap partition and allocated space is now listed in the *Partition Magic Screen*.

31) With **Unallocated** selected in the *Partition Magic Screen*, repeat step 15 and step 16 to create the next partition, using the following:

Partition: **Logical Partition**

Partition Type: **NTFS**

32) Type the Label as: **ARCHIVE**

Note: The Archive size will be any remaining space (for example, 14,456.9), therefore *do not type over the value displayed*.

The Archive partition and allocated space is now listed in the *Partition Magic Screen*.

33) Click the **Apply** button at the lower right of the screen.

The Batch progress menu is displayed.

34) When the message "*All operations complete*" is displayed, click **OK**.

35) Click **Exit**.

36.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-5-6 Full Re-ghost and Software Installation

NOTE: During software installation, all peripherals should be removed - including PCMCIA devices (but excluding the DVD\CD-RW driver).

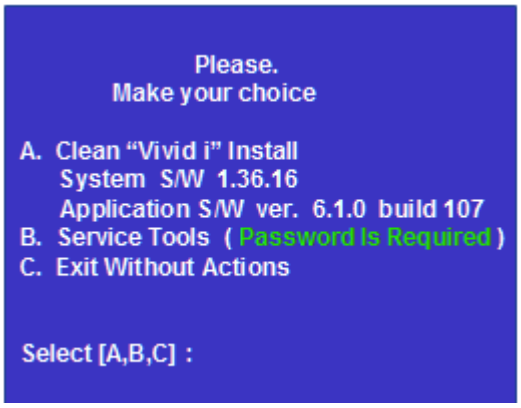
NOTICE **IMPORTANT** It is recommended to store partition C:\ by using the Rollback tool (described in the Software Roll-back Procedure on page 8 - 143) **after** full software installation or upgrade.

1) Connect the DVD\CD-RW to the USB port at the rear of the system.
2) Connect power to the DVD\CD-RW drive.
3) Place the CD containing the full software version into the *DVD\CD-RW* drive and close the tray.
4) Turn ON the Vivid-i™/ Vivid-q™ system and allow it to boot-up from the GHOST CD.

   The system powers ON and when system boot-up from the CD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

5) If this is first installation, format the hard disk as described in Formatting and Partitioning the Hard Disk - Automatic Procedure on page 8 - 126. When done, proceed to the next step, below.
6) Select option: **1: Vivid_i Full Clean Install (System + Application Software**)

   A menu will appear prompting for selection of the required option:


Please.
Make your choice
A. Clean "Vivid i" Install
System S/W 1.36.16
Application S/W ver. 6.1.0 build 107
B. Service Tools (Password is Required)
C. Exit Without Actions
Select [A,B,C] :

7) Select option **A: Install Software**

   The system will prompt you to type in the service password.
8) Type: **geulsservice** and press <**Enter**>.

   The software ghosting will take approximately 15 minutes.

IMPORTANT: ***Do not stop the software installation operation during this process!***

After re-ghosting (requires approximately another 10 minutes), the software installation will be complete. The system will re-start and prompt for the software License Password.

9) Type in the password provided for the specific software, and approve by clicking **OK**.

SW LICENSE
There is no valid license on this system. Enter a valid key below, or contact your GE sales representative.
HW Id
0
OK
Cancel

10) Restart the system and commence scanning.

11.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39
- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-5-7 Installing Software only from DVD

NOTE: During software installation, all peripherals should be removed - including PCMCIA devices (but excluding the DVD\CD-RW driver).

NOTICE **IMPORTANT** It is recommended to store partition C:\ by using the Rollback tool (described in the Software Roll-back Procedure on page 8 - 143) **after** full software installation or upgrade.

1) Connect the DVD\CD-RW to the USB port at the rear of the system.
2) Connect power to the DVD\CD-RW drive.
3) Place the DVD containing the full software version into the *DVD\CD-RW* drive and close the tray.
4) Turn ON the Vivid-i™/ Vivid-q™ system and allow it to boot-up from the DVD.

   The system powers ON and when system boot-up from the DVD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

5) Press **2** to perform installation of Vivid-i™/ Vivid-q™ Application Software only from DVD.

   The system will continue to boot up and the following screen is displayed.

When done, the Start Application screen is displayed, as shown in Figure 8-129.

Figure 8-129 Start Application Screen

6) Click on **Install Software** and follow the on-screen instructions.

A warning message is displayed, as shown in Figure 8-130.

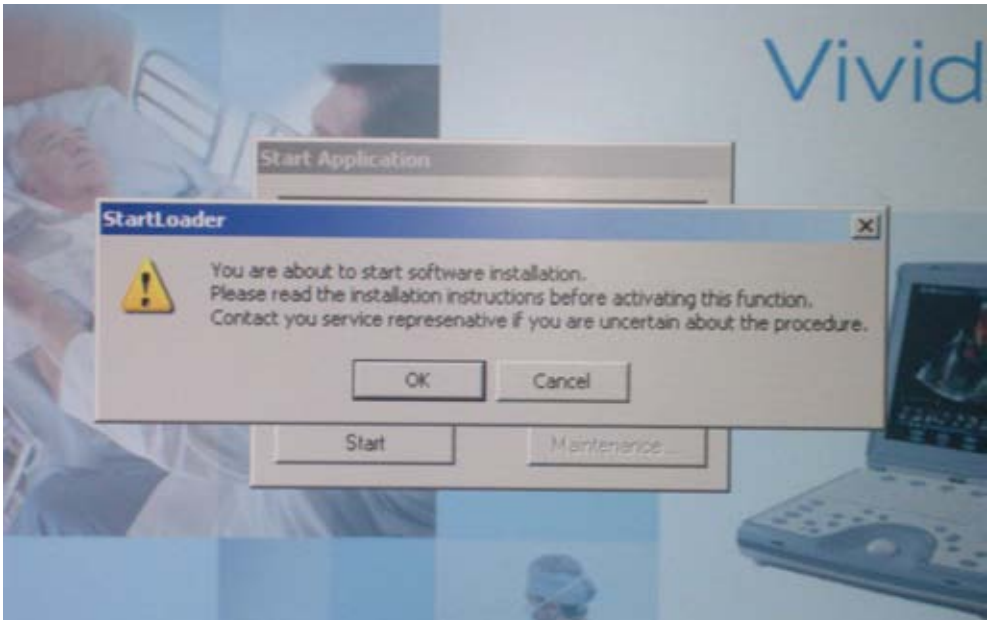


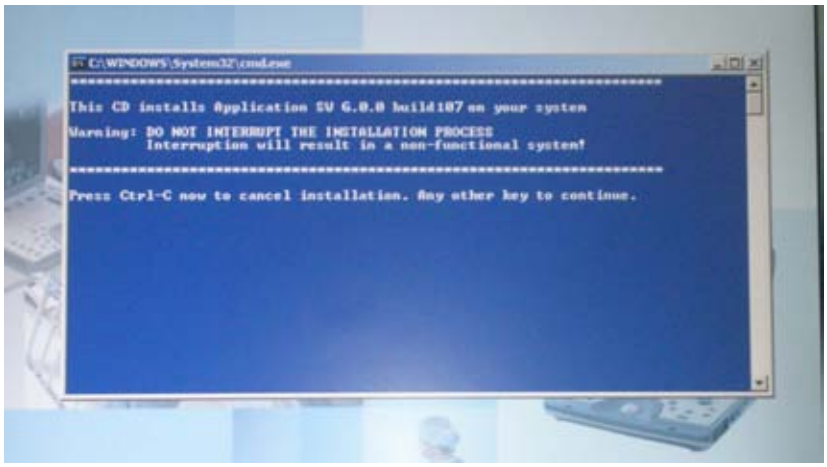
Figure 8-130 Start Software Installation Message

7) Click **OK**.

The following message is displayed:

8) Click **OK** to continue.

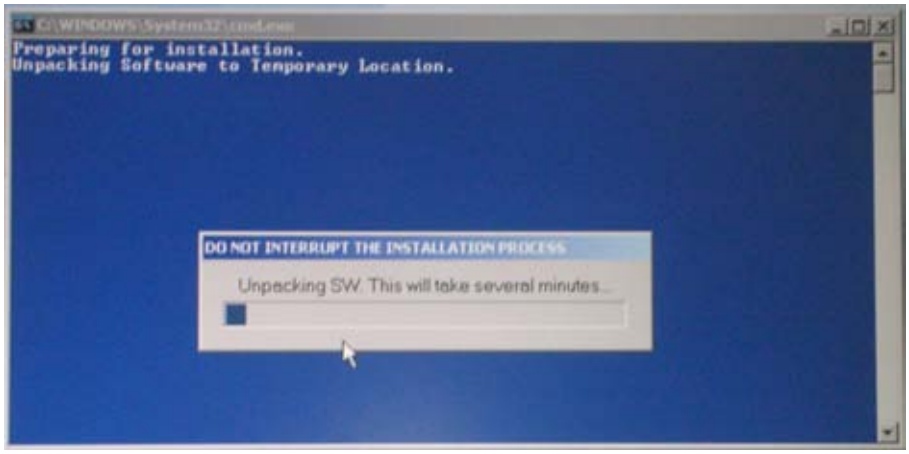
The following warning message is displayed:


This CD installs Application SW 6.0.0 build107 on your system
Warning: DO NOT INTERRUPT THE INSTALLATION PROCESS
Interruption will result in a non-functional system!
Press Ctrl-C now to cancel installation. Any other key to continue.

WARNING: DO NOT INTERRUPT THE INSTALLATION PROCESS. Interruption will result in a non-functional system!

9) Press any key to continue.

Installation commences and the following message is displayed:


Preparing for installation.
Unpacking Software to Temporary Location.
DO NOT INTERRUPT THE INSTALLATION PROCESS
Unpacking SW. This will take several minutes...

When done, the Installation Complete message is displayed:

Preparing for installation.
Unpacking Software to Temporary Location.
Installing Software To Target Locataion.
Installation complete.
Move cursor over this window and press SET button.
Press any key to reboot, then remove CD/MOD/DVD

Figure 8-131 Software Installation Complete Message

10) Move the cursor over the displayed message window and press the **SET** button.

11.) Press any key to re-boot the system.

The system re-boots into Normal Scanning mode.

12.) Press **Config** and then **About**.

The newly-installed software version is now listed under the System Version tab:

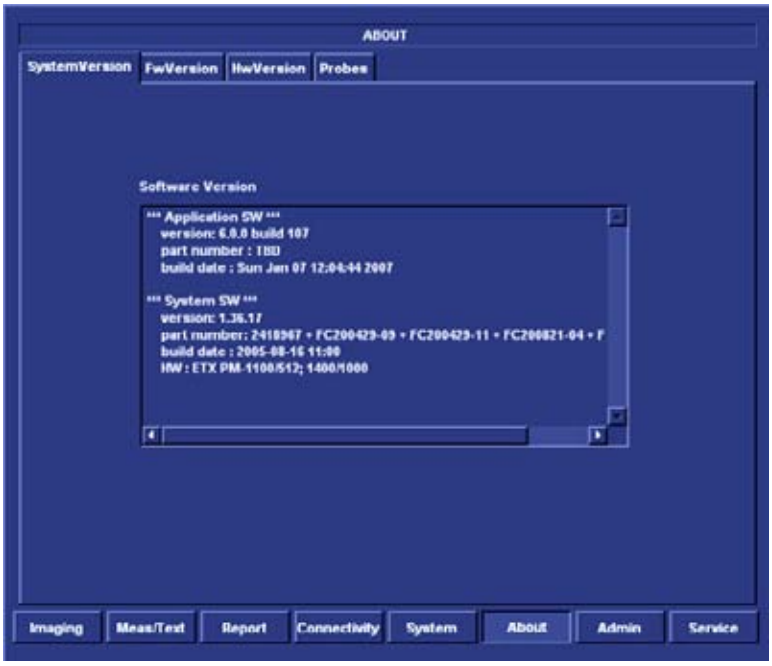


Figure 8-132 Software Version

13.) Remove the DVD from the *DVD\CD-RW* drive and close the tray.

14.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39

- Calibration Tests on page 7 - 25
- Full System Test on page 7 - 10

8-5-8 Installing Software only or Patch

NOTICE

I**MPORTANT** It is recommended to store partition C:\ by using the Rollback tool (described in the Software Roll-back Procedure on page 8 - 143) **after** full software installation or upgrade.

1) Connect the DVD\CD-RW to the system's USB port.
2) Connect the DVD\CD-RW power supply to the mains power.
3) Place the CD with Patch or Software Only CD into the tray and close.
4) Turn ON the system.

   During boot-up, system will prompt to install software or continue booting into regular mode.
5) Click on **Install Software** and follow the on-screen instructions.
6.) When done, the Installation Complete message is displayed (refer to Figure 8-131 on page 8-137).
7) Move the cursor over the displayed message window and press the **SET** button.
8.) Press any key to re-boot the system.

   The system re-boots into Normal Scanning mode.
9.) Press **Config** and then **About**.

   The newly-installed software version is now listed under the System Version tab (refer to Figure 8-132 on page 8-137).
10.) Remove the CD from the *DVD\CD-RW* drive and close the tray.
11.) Proceed to perform the following functionality tests:
   - Software Configuration Checks on page 4 - 39
   - Calibration Tests on page 7 - 25
   - Full System Test on page 7 - 10

8-5-9 Installation of PMC Version

1.) Allow the system to boot up into *Normal Scanning* mode.

2) Press **Config**.

The system will prompt you to login.

3) Login as **ADM**.

The default password is **ulsadm**

4) Press the **About** button and activate the **FwVersion** tab; verify that PMC version is 19 or above, as shown in the example in Figure 8-133 below.

Figure 8-133 Verifying PMC Version

5) Turn the system OFF and remove the DVD USB cable and both battery and AC adapters.

6) Connect the AC adapter **only** (NO BATTERY).

7) Boot up the system in **Maintenance** mode, using the Service Dongle.

8) Go to the following directory: My Computer **C:\marlin\Target\bin**.

9) Run **PMCbootloader.exe** by double-clicking on it - see Figure 8-134 below.

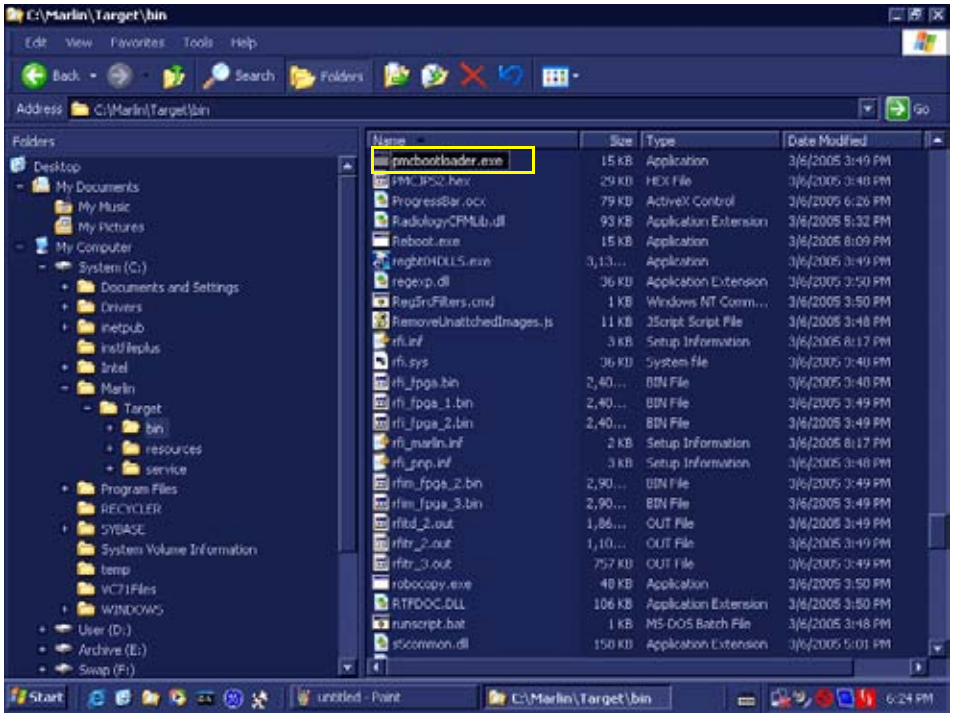
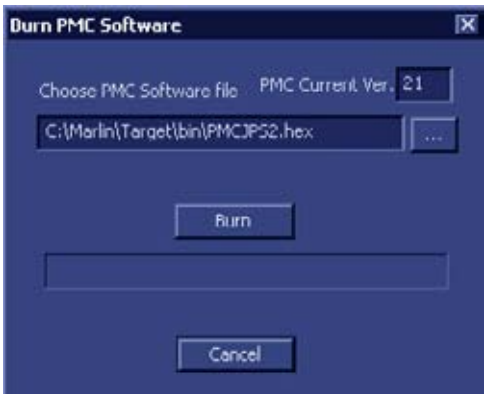


Figure 8-134 Run PMCbootloader.exe

A window is displayed showing the current PMC version and the path of the PMCJPS2.hex file:



10.) Click **Burn**.

The burning process will take approximately 30 seconds.
When done, a brief message will appear "**Burning process failed…**" - see Figure 8-135 below.

Note: The failed message is normal and should be anticipated.

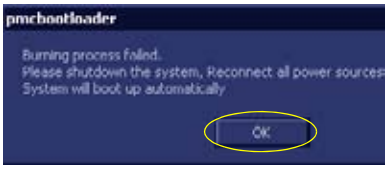


Figure 8-135 Burning Process Failed Message

11) Click **OK**.

The system should shutdown automatically.
(The screen will appear blank but fans will remain running and the On/Off key will be disabled).

12) Power-down the system by removing the AC adapter.

13.) Remove the Service Dongle.

14.) Wait approximately 5 seconds, then boot-up the system again.
Allow the system to boot up into *Normal Scanning* mode.

15) Press **Config**.

The system will prompt you to login.

16) Login as **ADM**.

The default password is **ulsadm**

17) Press the **About** button and activate the **FwVersion** tab; verify that PMC version is now 23, as shown in the example in Figure 8-136 below.

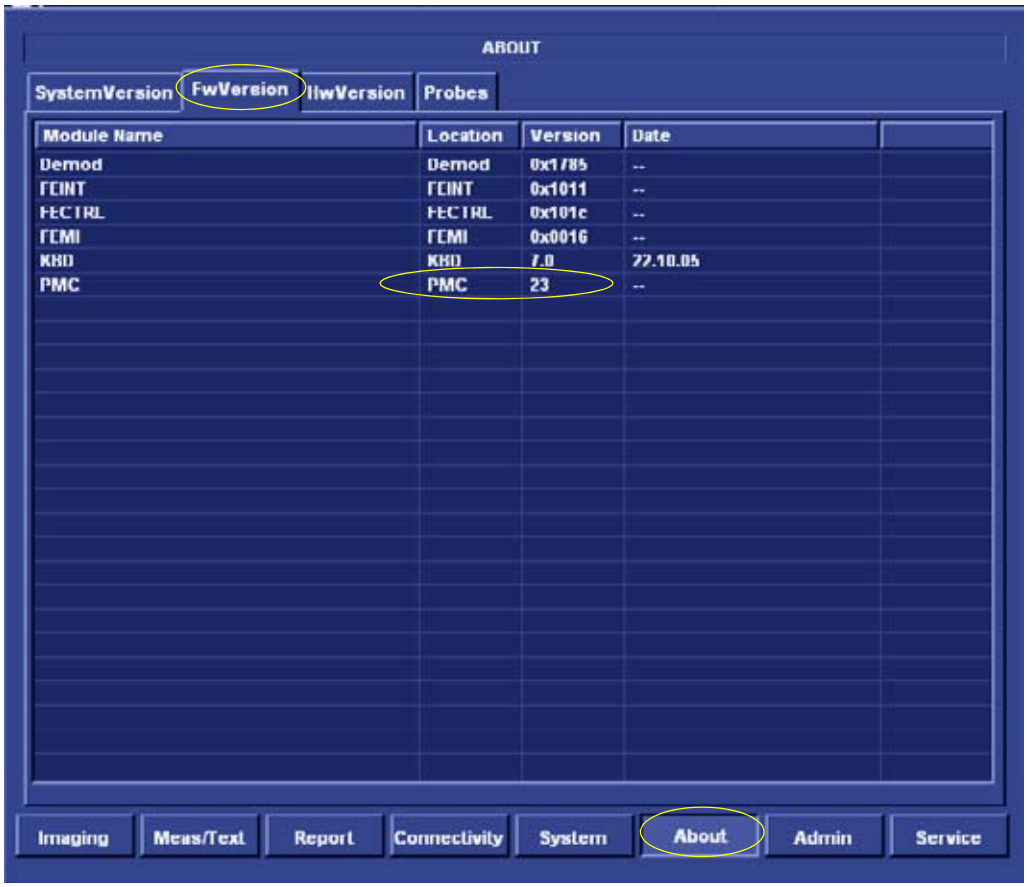


Figure 8-136 Checking the PMC Version

18) In the event that the PMC version is other than 23, burning has failed and it is necessary to repeat the procedure from step 5 above. Also, refer to the note below.

Note: When failing to load PMC version 23

In some cases, PMC loading may fail. Failure is indicated when performing step 17 above if a value other than 23 is shown for the PMC version. In this case the process needs to be repeated. Other indications of failure are that the system does not shut down automatically (step 11 above), or there is a strange pattern on the display.

In the event that failure has occurred, perform a full shut-down (if necessary, remove the AC adapter if the system seems to be "frozen"). Re-boot the system in **Maintenance** mode, using the AC adapter *only*. Continue from step 5 above.

19.) Proceed to perform the following functionality tests:

- Software Configuration Checks on page 4 - 39
- Power ON/Boot-up on page 4 - 4
- Power Shut Down on page 4 - 8

8-5-10 Software Roll-back Procedure

In the event that it is necessary to save and restore the Operating System and Application Software, use the software roll-back (Re-ghost) tool provided, as described in the procedure in Table 8-7.

NOTE: Using the Rollback tool requires the Software Installation CD. Always keep this near the scanner.

Table 8-7 Software Roll-back Procedure

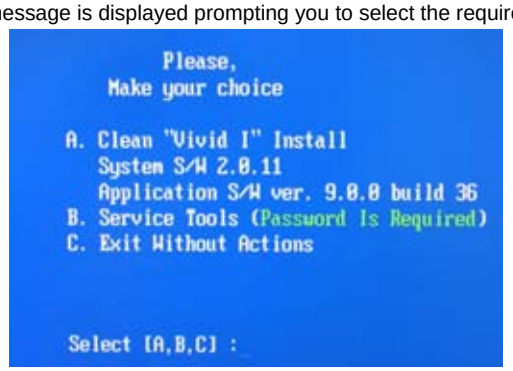
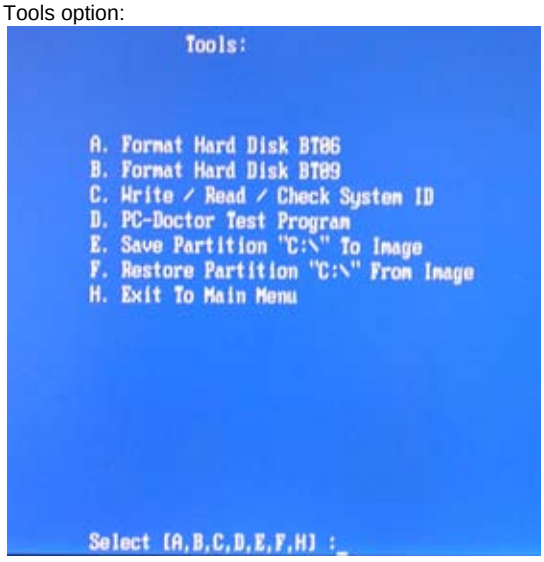
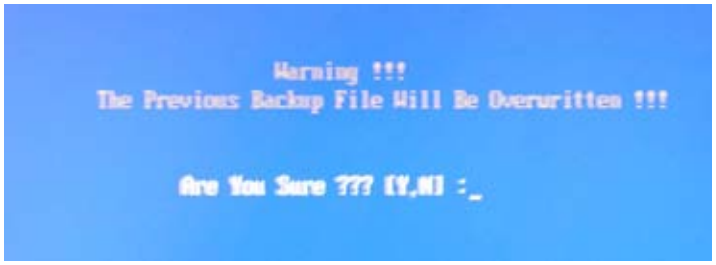
Step	Instruction	Expected Result
1	Eject the battery and remove all peripherals currently connected to the system, with the following exceptions: Make sure no peripherals are connected to the USB connectors except the DVD and the PCMCIA.	
2	Press the <Eject> button of the DVD\CD-RW drive and remove any media if present.	The DVD\CD-RW drive tray ejects.
3	Insert the CD provided with the software kit, and press the <Eject> button again.	The DVD\CD-RW drive tray will load the software CD.
4	Hold down the <ON/OFF> button for 5 seconds to shutdown the system.	The shutdown options are displayed on-screen.
5	Select **Full Shutdown**.	The system powers down.
6	Hold down the <ON/OFF> button for three seconds.	The system powers ON and when system boot-up from the CD is complete, the following message is displayed prompting you to select the required option: 
7	Select option **B**. **Service Tools**	The user is prompted for a password.
8	When prompted, type the following password: **geulsservice** and press <**Enter**>. Note: when typing the password, use lower-case letters.	Wait until the following message is displayed, prompting you to select the required Tools option: 

Table 8-7 Software Roll-back Procedure(cont'd)

Step	Instruction	Expected Result
	Select one of the following options, as applicable. **E: Save Partition "C\:\" To Image** **F: Restore Partition "C\:\" From Image**	The following Warning is displayed: 
9	To continue, type **Y**.	A message is displayed showing the current system ID. The CD then begins the software installation process and a progress indicator is displayed, as shown below: This stage of the process takes approximately 5 mins. A message is then displayed on-screen prompting you to press <CTRL + ALT + DELETE> to reboot the system.
10	Press <Eject> and remove the CD. Press <CTRL+ALT+DELETE>.	The system re-boots.
11	Proceed to perform the following functionality tests: • Software Configuration Checks on page 4 - 39 • Calibration Tests on page 7 - 25 • Full System Test on page 7 - 10	

Section 8-6
Performing a Complete System Back-up

NOTICE

IMPORTANT: Contact the customer and request that a full incremental back-up be performed prior to upgrade. If necessary, refer them to the Vivid-i™/Vivid-q™ User Manual. Ask for removal (delete) of un-necessary patient information, so that the back-up process will require minimal time.

Remind customers that GE Medical Systems strongly recommends that periodic back-ups of their Archive be performed. This routine back-up process will assure the retention of all the information that is temporarily saved into the local Archive (hard-disk). The permanent Archive is the backed-up Archive on the variety of medias.

Do not proceed with the upgrade process if a complete incremental back-up process has not been performed. Contact the On-Line Center to resolve any back-up process issues, before proceeding with the upgrade. Ignore this note if back-up of patient information is not required, as per the customer's instructions.

8-6-1 Database Merge

The Database Merge process can be implemented by using the Import/Export functions of the Vivid-i™/ Vivid-q™ system, as described in the procedure below.

8-6-1-1 Preparation

1.) If not already connected, connect the DVD\CD-RW to the USB port at the rear of the system and connect power to the DVD\CD-RW drive.
2.) Press the <Eject> button of the DVD\CD-RW drive to verify that no disc is present in the disk drive.

8-6-1-2 Database Merge Procedure

8-6-1-2-1 Logging on to the System

1.) Bootup the system using the service dongle.

The Maintenance Access dialog box opens.

2.) Enter the current applicable service password. Click **OK**.
3.) In the Start Application screen that is displayed, click **Start**.

The system opens at the default scanner screen.

NOTE: You can access the scanner default screen from the Windows Desktop as follows:

1.) Click the Windows **Start** button at the bottom left corner of your screen and select **Run** from the scroll-down menu.
2.) At the command prompt, type "**Echoloader /service**" and click **OK**.

The default scanning screen opens.

8-6-1-2-2 Running Disk Management

NOTE: See Disk Management in the Vivid-i™ or Vivid-q™ User's Manual on your document CD.

1.) Insert media (e.g. CD/DVD) or connect to a network repository.
2.) From the keyboard, press the **Config** button.

The Operator Logon screen opens - see Figure 8-137.

Figure 8-137 Operator Logon Screen

3.) In the password field, type the required password.

NOTE: The Operator Logon screen only appears after the first boot up of the system.

4.) Insert media (e.g. CD DVD) or connect to a network repository.

5.) Click the **Admin** tab at the bottom of the screen.

6.) Click the **Disk Management** tab at the top of the screen - see Figure 8-138.

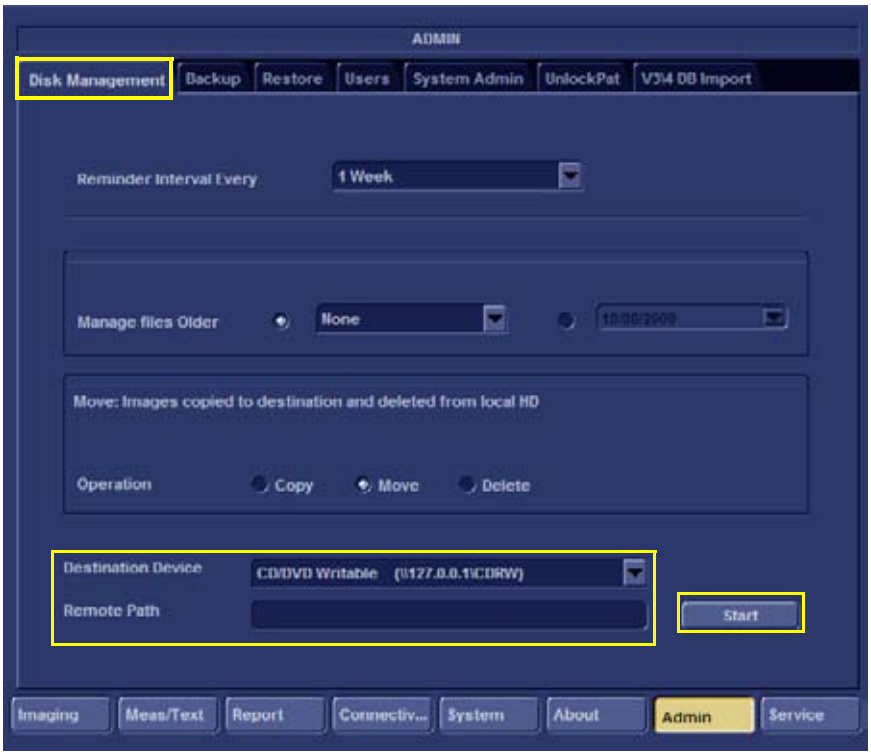


Figure 8-138 Admin Screen

7.) Under Operation, select **Copy** - see Figure 8-139.

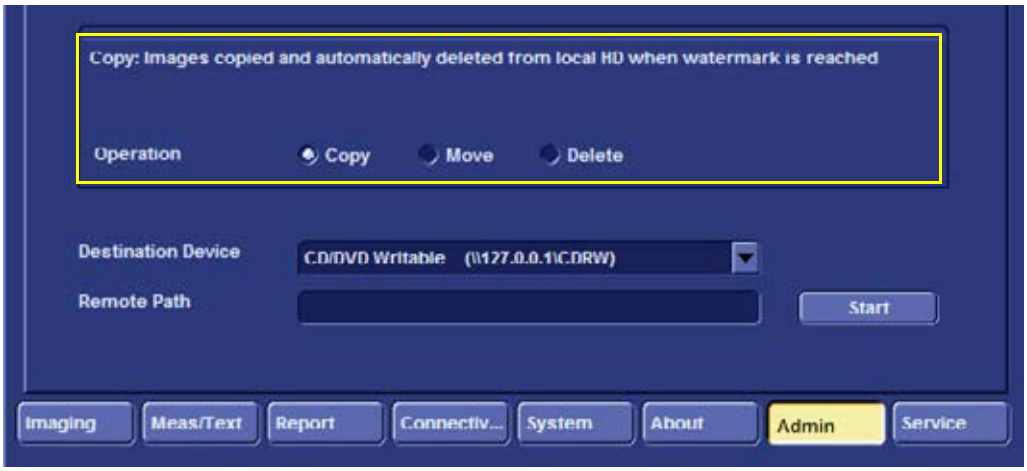


Figure 8-139 Copy Images for Export

8.) Under Destination Device (see Figure 8-138), select the required media device.

9.) Click **Start** and follow the on-screen wizard instructions.

The system stores the images.

8-6-1-3 Running the Export Procedure

1.) Insert the required storage media into the system.

2.) From the keyboard, press the **Patient** button.
The patient menu opens - see Figure 8-140

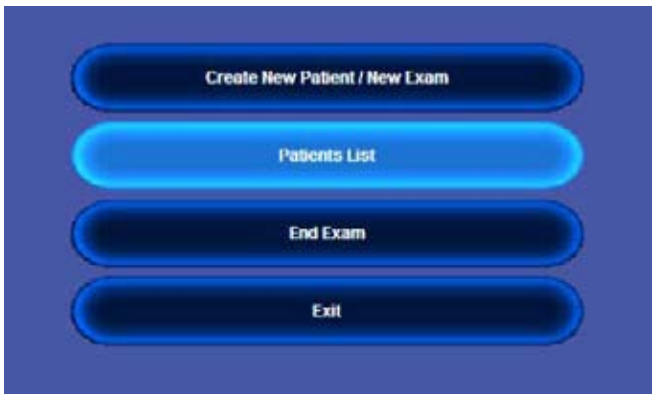


Figure 8-140 Patient Menu

3.) From the screen, select the **Patients List**.

The Search / Create Patient screen is displayed - see Figure 8-141.

.

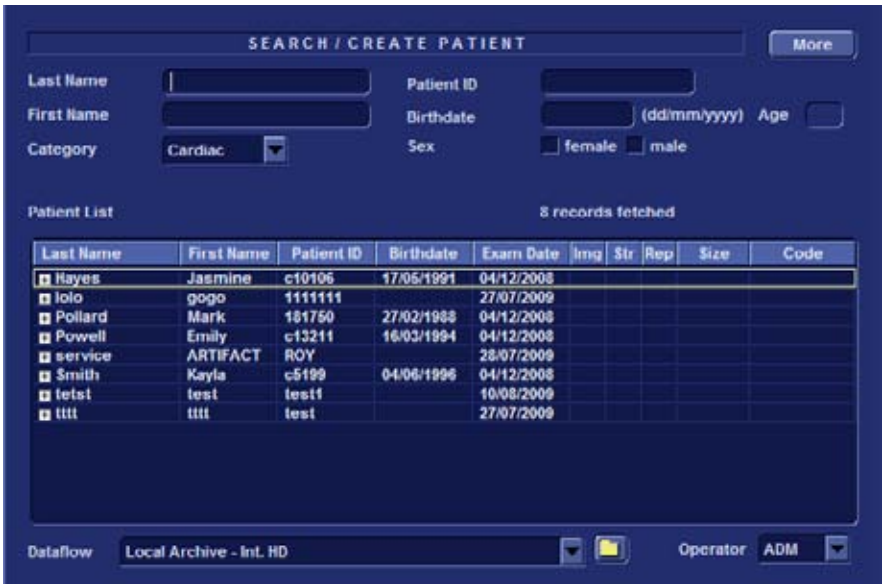


Figure 8-141 Search / Create Patient Screen

4.) Click the **Export** soft-key at the bottom of the screen - see Figure 8-142.

*NOTE: If the Export button is not displayed, click **More** consecutively until the Export button is displayed:*

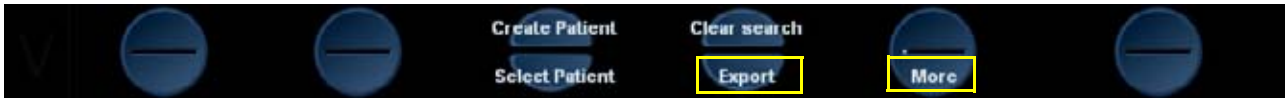


Figure 8-142 Export and More Soft-Keys

The following warning (Figure 8-143) is displayed to indicate that only the database is exported to the target media.

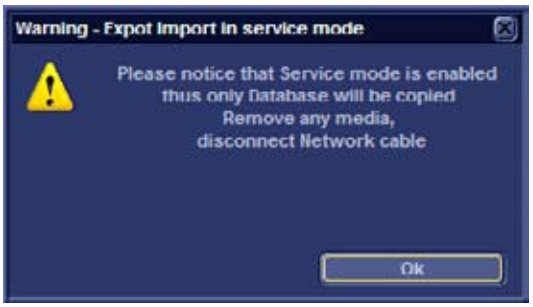

Warning - Expot Import in service mode
Please notice that Service mode is enabled
thus only Database will be copied
Remove any media,
disconnect Network cable
Ok

Figure 8-143 Database Export Warning

5.) Click **OK**.

The Export screen opens - see Figure 8-144.

Figure 8-144 Export Screen

6.) From the Export screen, select the required destination media (Figure 8-144) and click **OK**.

The Export Patient List screen opens - Figure 8-145.

Figure 8-145 Export Patient Archive

7.) Click the soft-keys at the bottom of the screen consecutively in the following order as the system processes the actions: **Select All**, **Copy**, and **Done** - see Figure 8-146.

Figure 8-146 Soft Keys

8-6-1-4 Running the Import Procedure

NOTE: This procedure is applicable when importing files from various media devices.

1.) Log on to the system as described in Logging on to the System on page 8 - 145.
2.) Insert the media (where the data in the previous section is stored), into the system.
3.) From the keyboard, press the **Patient** button; on the screen, click **Patient List**.

The Search Create Patient screen appears - Figure 8-141.

4.) Click the **Import** soft-key at the bottom of the screen - see Figure 8-147.

Figure 8-147 Soft-key Import Button

*NOTE: If the Import button is not displayed, click **More** consecutively until the Import button is displayed.*

NOTE: A warning is displayed (Figure 8-149) - to indicate that only the database is imported to the target device.

Warning - Expot Import in service mode
Please notice that Service mode is enabled
thus only Database will be copied
Remove any media,
disconnect Network cable
Ok

Figure 8-148 Database Export Import Warning

5.) Click **OK**.

The Import screen appears - see Figure 8-149.

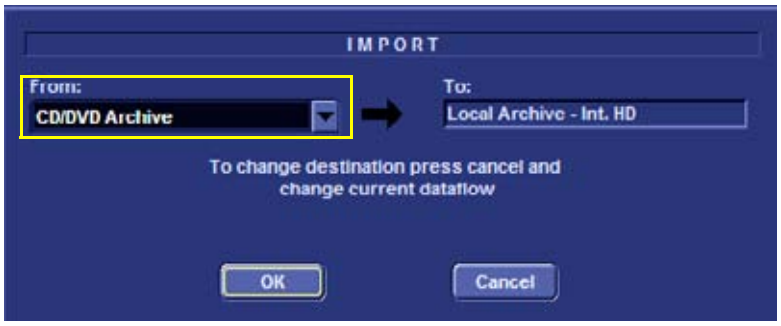


Figure 8-149 Import Screen

6.) Under "From" in the Import screen, select the required media source from the drop-down list (see Figure 8-149).

*NOTE: If an Import / Export Conflict screen displays (this could occur if two separate examinations (this could occur if two separate examinations were saved under the same name), click **OK** and continue.*

7.) Click the soft keys **Select All**, **Copy**, and **Done**, consecutively in that order as the system processes the actions - see Figure 8-150**.**

Figure 8-150 Select All, Copy and Done Buttons

NOTE: Wait while the system processes each action before pressing the next soft-key.

8.) Press **Alt + E** to eject the CD.

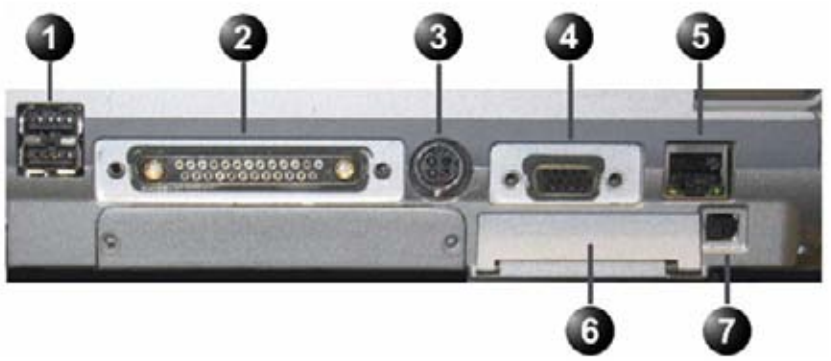
9.) Press **2D** on the keyboard to return to the default scanner screen.

8-6-2 How to Restore User-defined Presets

For details, refer to Archiving and Loading Presets on page 4 - 16.

Section 8-7
Peripherals

NOTE: This section provides references to the installation procedures for the various peripherals used with the Vivid-i™/Vivid-q™ portable ultrasound scanner. Connection to the system is via one of the USB ports (unless otherwise stated) on the rear panel, as shown in Figure 8-151 below.



1. Two interchangeable USB ports (digital printer, CD-RW and other peripherals)
2. Docking connector
3. Port for DC IN (AC Adapter).
4. SVGA Output (VCR option or CRT monitor option)
5. LAN 10/100 Base-TX Ethernet network connector
6. PCMCIA port for PC card.
7. Ejection lever for PCMCIA device

Figure 8-151 Vivid-i™/ Vivid-q™ Rear Panel

8-7-1 Connecting and Removing Peripherals

For detailed instructions on connecting peripherals to the Vivid-i™/Vivid-q™ portable ultrasound scanner, refer to the following procedure, as appropriate.

- USB Global Modem on page 3 - 27
- Wireless USB Network Adaptor on page 3 - 28
- DVD/CD-RW Drive on page 3 - 28
- MOD Drive on page 3 - 35
- External USB Hard Disk on page 3 - 36
  For detailed installation and removal instructions, see External USB Hard Disk Replacement Procedure on page 8 - 154
- USB Memory Stick on page 3 - 38
- Connecting the Black & White Printer on page 3 - 42
- Connecting the Digital Color Printer on page 3 - 43
- Connecting the DeskJet Color Printer on page 3 - 45
- Connecting the VCR on page 3 - 52

Following the connection and removal of peripherals, perform the following functionality tests:

- Grounding Continuity (Systems with SafeLock Cart) on page 10 - 22 - only if the Vivid-i™/ Vivid-q™ system is currently mounted on the SafeLock cart
- Chassis Current Leakage Test on page 10 - 24

8-7-2 External USB Hard Disk Replacement Procedure

NOTE: This procedure is only applicable to Vivid-i™/ Vivid-q™ systems mounted on the SafeLock Cart

NOTE: This section describes removal and replacement procedures, including initial configuration.

Figure 8-152 External USB Hard Disk

8-7-2-1 Tools

Appropriate flat screwdriver and open-ended wrench.

8-7-2-2 Time Required

15 minutes

8-7-2-3 Preparations

Shut down the Vivid-i™/ Vivid-q™ ultrasound unit, as described in *Chapter 3 - Installation*.

8-7-2-4 External USB Hard Disk Removal Procedure

NOTE: Ensure that there is no activity on the drive before you turn it off.
If power is turned off while files are being written to the drive, the files will be corrupted.

1) Switch OFF the power to the unit.
   The power switch is located at the rear of the unit - see Figure 8-153 on page 8-155.
2) Disconnect the AC Power cable (connected between the power supply and the SafeLock Cart) from the SafeLock Cart AC power outlet.
3) Disconnect the External USB Hard Disk from the USB port on the Vivid-i™/ Vivid-q™ system.
4) Remove the unit.

NOTE: If the External USB Hard Disk is filled with data, store it in a safe place and label it with the date, and a note that the drive is full.

External USB Hard Disk - Rear View

AC/DC Power Converter and Cables

Figure 8-153 External USB Hard Disk - Rear View and Cables

WARNING: In the event that the AC/DC Power Converter and Cables have been supplied with the Power IN Cable Part # 066E0661 (color white), discard this cable and DO NOT USE. Order the correct Power IN Cable Part # 5400905 (color black).

8-7-2-5 External USB Hard Disk Installation Procedure

1) Connect the USB 2.0 cable to the USB 2.0 socket at the rear of the disk unit.
2) Connect the cable from the power supply to the power connector on the rear of the disk unit.
3) Verify that the volume configuration is set to RAID 1
   The External USB Hard Disk is configured as a mirrored volume (RAID 1).
   This ensures optimal data integrity and immediate access to the data, even if one disk fails.
4.) Verify that both MODE switches are set to the ON position as illustrated

NOTE: The total RAID 1 capacity is half the physical capacity of the two drives.

CAUTION: Changing the volume configuration will erase all existing data!
If the drive contains files you want to save, move them to another drive before changing the switch settings.

5) Connect the AC power cable from the power supply to the AC power outlet on the SafeLock Cart.

6) Switch ON the power.

7) Study the status light indicators and verify that they function as described in Figure 8-154.

1. HDD1 connection/power indicator
Glows white when the hard disk is connected and the drive is powered up. Blinks when building a mirrored RAID if HDD1 is the target disk.

2. HDD1 status indicator
Displays the status of the hard disk.
See the status indicator color/state chart below.

3. HDD2 connection/power indicator
Glows white when the hard disk is connected and the drive is powered up. Blinks when building a mirrored RAID if HDD2 is the target disk.

4. HDD2 status indicator
Displays the status of the hard disk. See the status indicator color/state chart below.

Status Indicator Color and State:

- Flashing blue - Hard drive is being accessed
- Solid blue - Array is being rebuilt
- Red - Disk failure

Figure 8-154 External USB Hard Disk - Status Light Indicators

8-7-2-6 Changing the Volume Name

NOTE: It is important that the External USB Hard Disk has a unique volume name. The site should choose a naming convention to use for marking this Hard Drive and any future hard drives, in case more than one drive will be needed in the future.

NOTE: Only connect one USB storage device (like this External USB Hard Disk) to the Vivid-i™/ Vivid-q™ scanner at a time.

Follow these steps to set the Volume Name:

1) Connect the USB cable from the External USB Hard Disk to a laptop or PC.

2) Power up the External USB Hard Disk.

3) Under My Computer, after a while, the disk will show as a new drive, named **Removable Disk** - refer to Figure 8-155 on page 8-157. (It will be allocated the next available drive letter.)

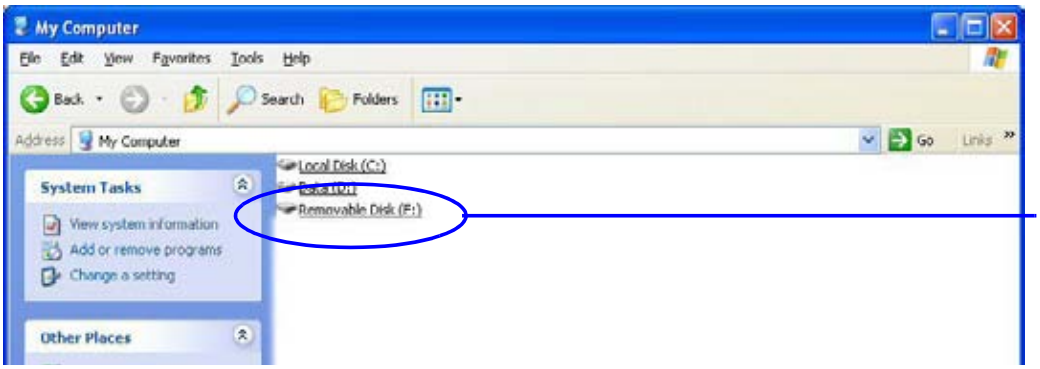


Figure 8-155 Removable Disk Shown under My Computer

4) Right-click the drive name (**Removable Disk**) and select **Rename** from the menu.

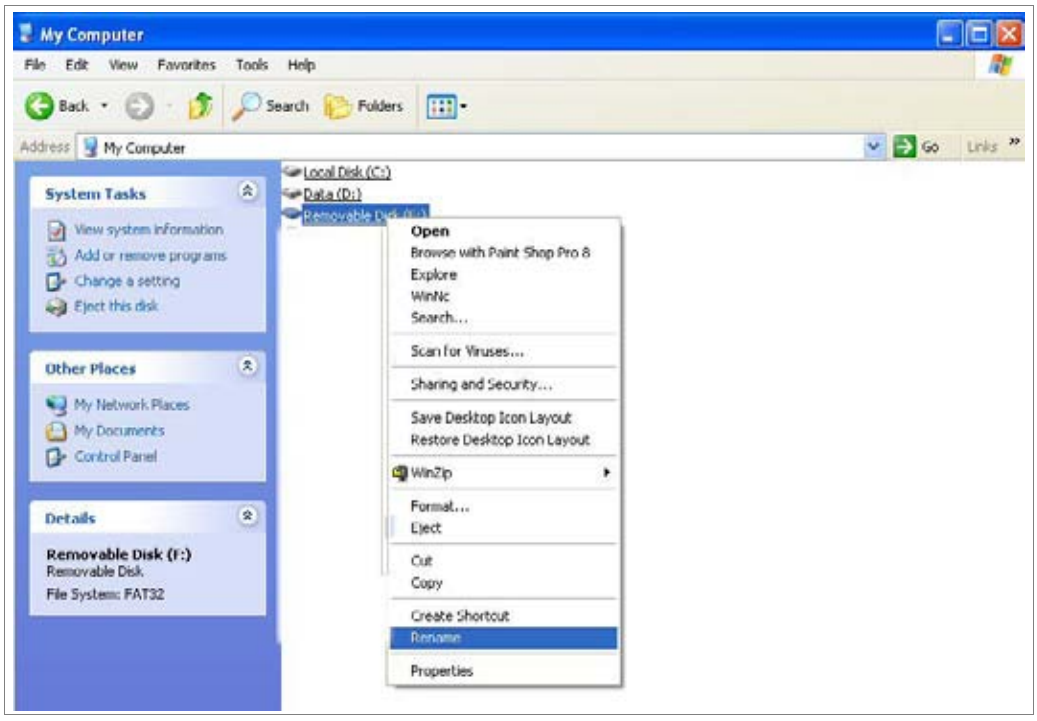


Figure 8-156 Select Rename from the Drop-down Menu

5) Enter the name you have decided to use for the drive.

Figure 8-157 Changing the Name

6) When done, click somewhere outside the name. The name will then be changed.

7) Record the Volume's name on a sticker or a piece of paper and attach it to the drive so that it will be easier to locate the correct drive in the future.

8) Use the "Safely Remove Hardware" tool in the Task Bar before continuing with the next step.

9) Disconnect the USB cable from the laptop or PC.

8-7-2-7 Connecting the External USB Hard Disk to the Vivid-i™ or Vivid-q™ Scanner

1) Connect the USB cable to a USB port on the Vivid-i™ or Vivid-q™ scanner.

2.) Turn ON power to the Vivid-i™/ Vivid-q™ ultrasound scanner.

3) Under My Computer (refer to Figure 8-155 on page 8-157), verify that the drive appears for selection.

4) Proceed to perform the following functionality tests:
   - External USB Hard Disk Test on page 4 - 33

Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of replacement parts for the Vivid-i™ portable ultrasound scanner.

Table 9-1 Contents in Chapter 9

Section	Description	Page Number
9-1	Overview	9-1
9-2	List of Abbreviations	9-2
9-3	Renewal Parts Lists and Diagrams	9-3
9-4	Peripherals	9-31
9-5	Disposables	9-37

Section 9-2
List of Abbreviations

- **Assy** - Assembly
- **BEP** - Back End Processor
- **Ctrl** - Control
- **FEP** - Front End Processor
- **FRU 1** - Replacement part available in parts hub
- **FRU 2** - Replacement part available from the manufacturer (lead time involved)
- **LCD** - Liquid Crystal Display
- **Int** - Internal
- **I/O** - Input/Output
- **PWA** - Printed Wire Assembly
- **Recv** - Receive
- **XFRMR** - Transformer

Section 9-3
Renewal Parts Lists and Diagrams

9-3-1 Covers

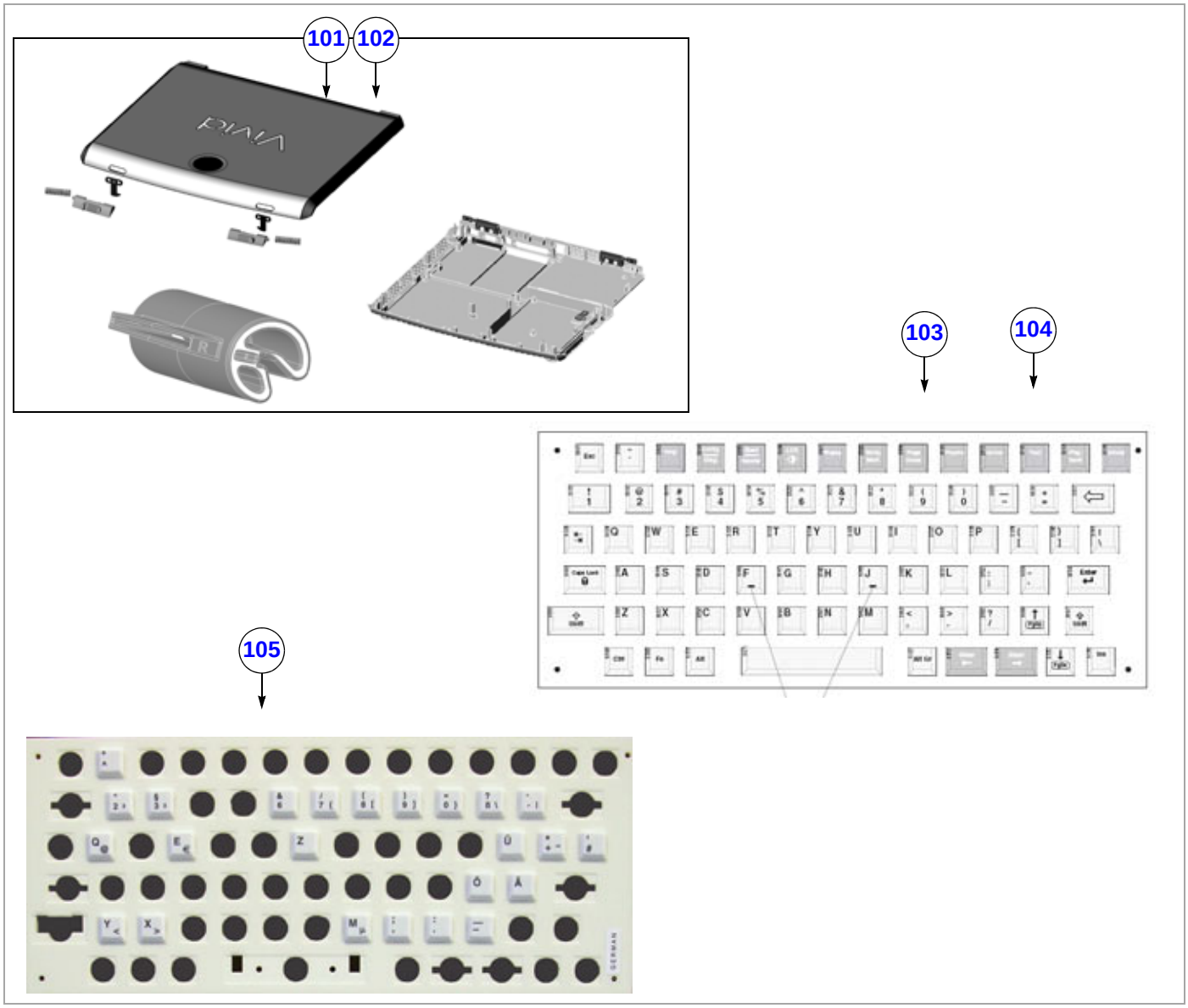


Figure 9-1 Covers - Diagram 1

Table 9-2 Covers - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™ BT11	Vivid-q™ BT11
101	Vivid-i™ Cover Kit	S2423361				✔	✔
102	Vivid-q™ Cover Kit	S2423362				✔	✔
103	Keycap Kit	S2423359				✔	
104	Keycap Kit Vivid-q™ BT09	S2423463					✔
105	Keycap Set German	S2422620				✔	✔

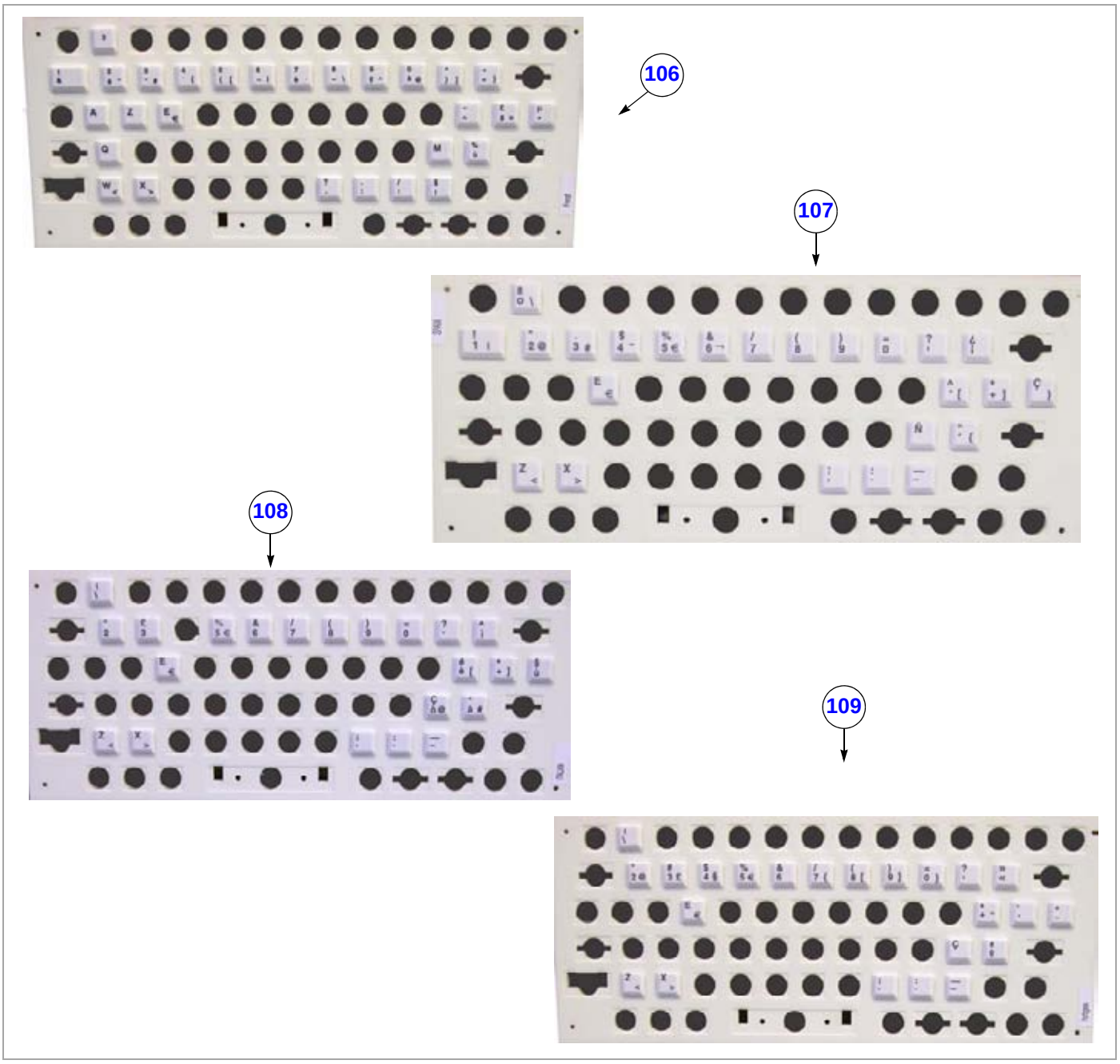


Figure 9-2 Covers - Diagram 2

Table 9-3 Covers - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
106	Keycap Set French	S2422621				✔	✔
107	Keycap Set Spanish	S2422622				✔	✔
108	Keycap Set Italian	S2422623				✔	✔
109	Keycap Set Portuguese	S2422624				✔	✔

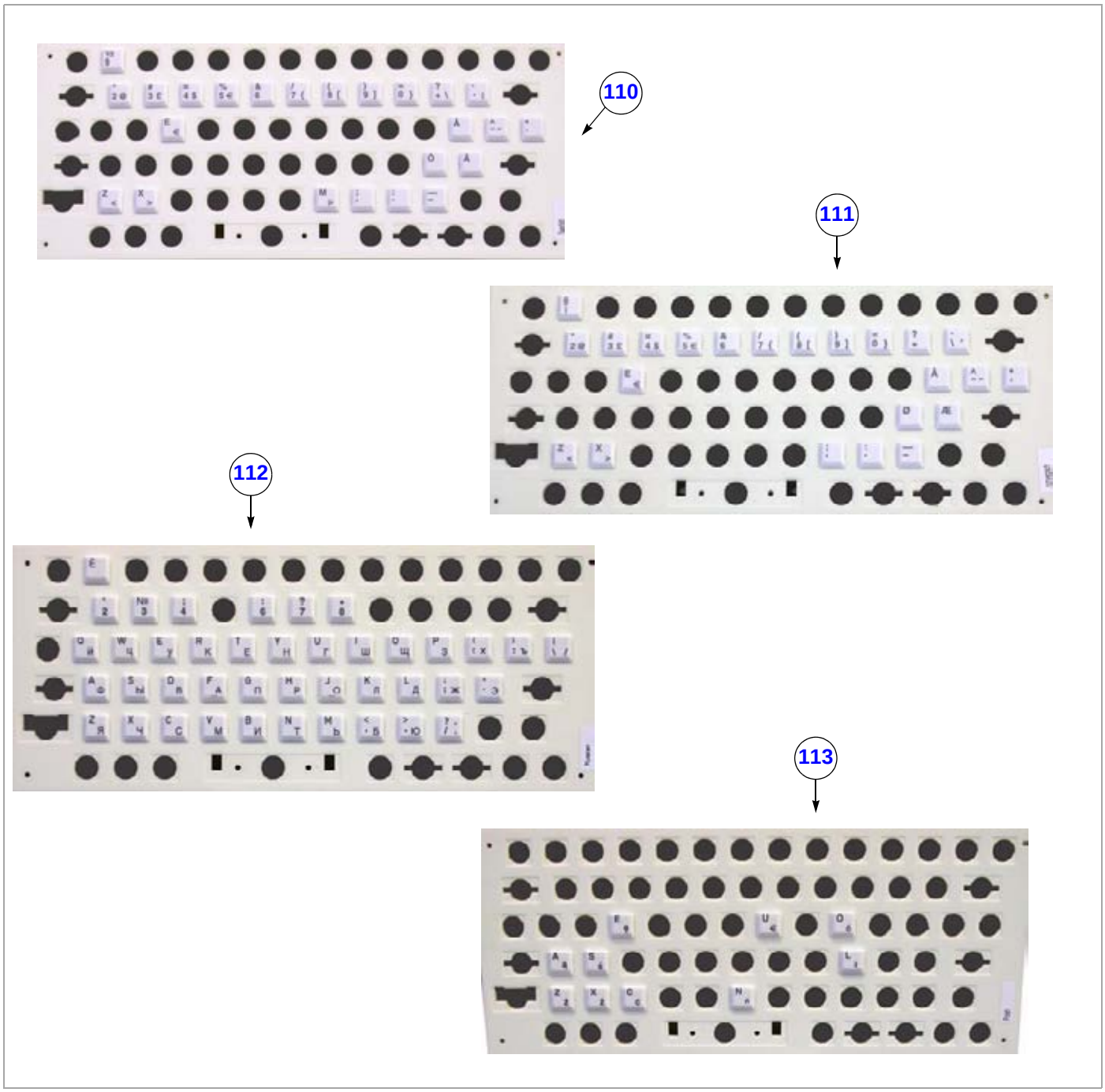


Figure 9-3 Covers - Diagram 3

Table 9-4 Covers - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™ BT11	Vivid-q™ BT11
110	Keycap Set Swedish	S2422625				✔	✔
111	Keycap Set Norwegian	S2422626				✔	✔
112	Keycap Set Russian	S2422627				✔	✔
113	Keycap Set Polish	S2422628				✔	✔

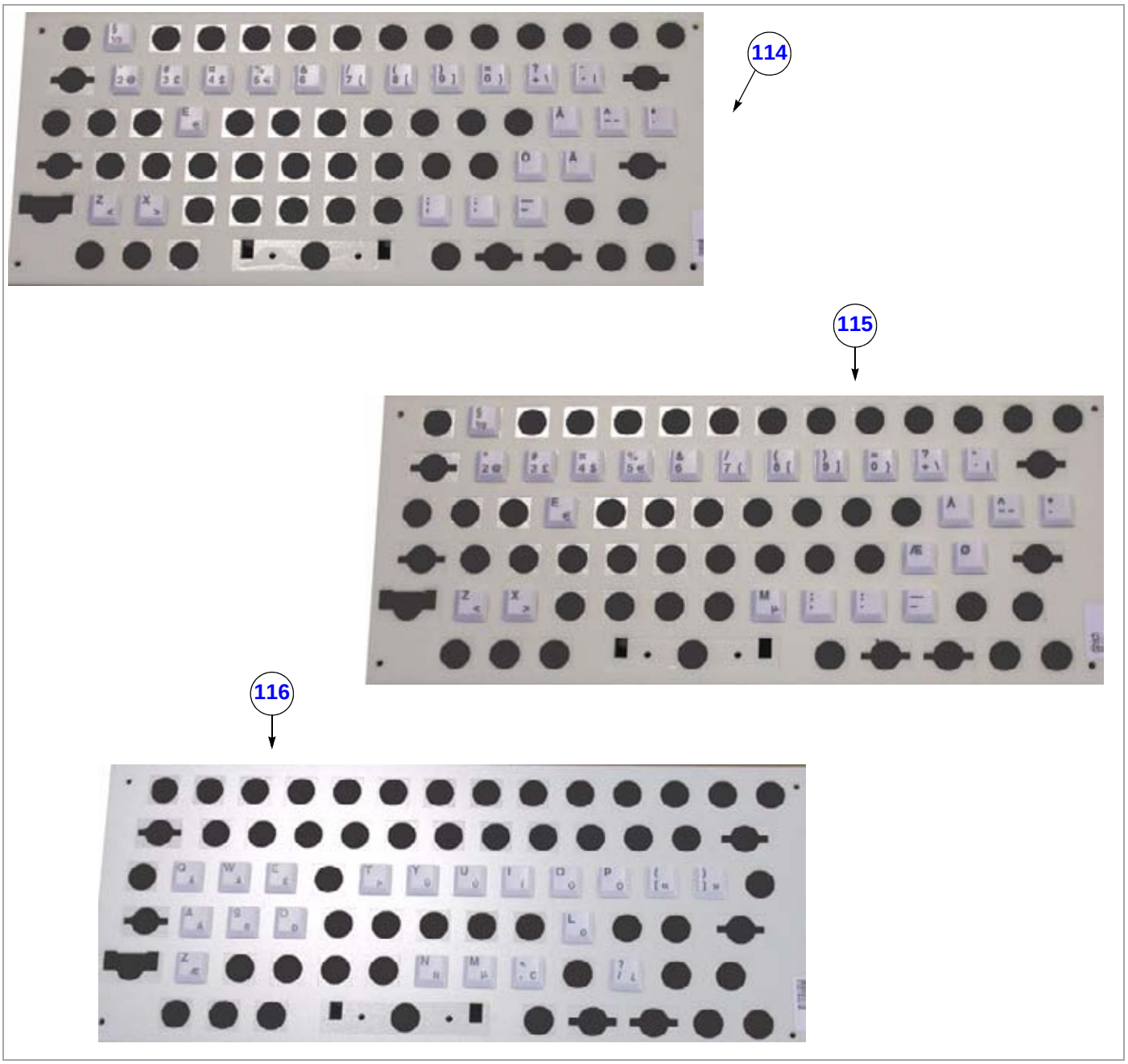


Figure 9-4 Covers - Diagram 4

Table 9-5 Covers - Diagram 4

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
114	Keycap Set Finnish	S2422629				✔	✔
115	Keycap Set Danish	S2422630				✔	✔
116	Keycap Set International	S2422631				✔	✔

9-3-2 Mechanical Hardware Parts

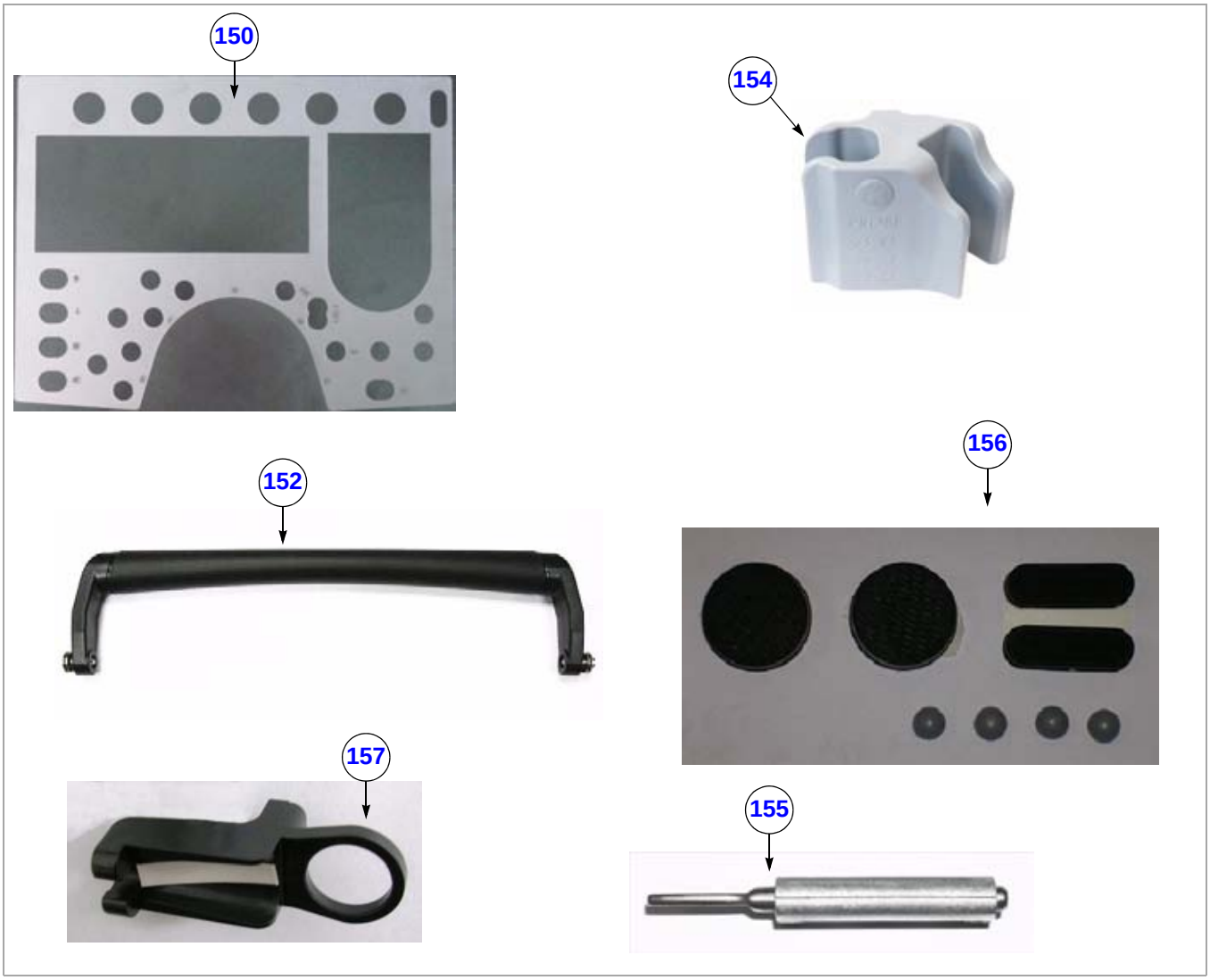


Figure 9-5 Mechanical Hardware Parts

Table 9-6 Mechanical Hardware Parts

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
150	Keyboard Overlay Vivid-i™	2413605				✔	✔
151	Screw Kit	2410801				✔	✔
152	Handle (Black)	S2423363				✔	✔
153	Probe Locker Kit	S2424216				✔	✔
154	Probe Holder	S2418520				✔	✔
155	Hinges concealed 45 mm 52 mm	2381805-2				✔	✔
156	Rubber Inserts Kit	2410804				✔	✔
157	AC/DC Reverse Polarity Preventor	5390565				✔	✔

9-3-3 SafeLock Cart Sub FRUs

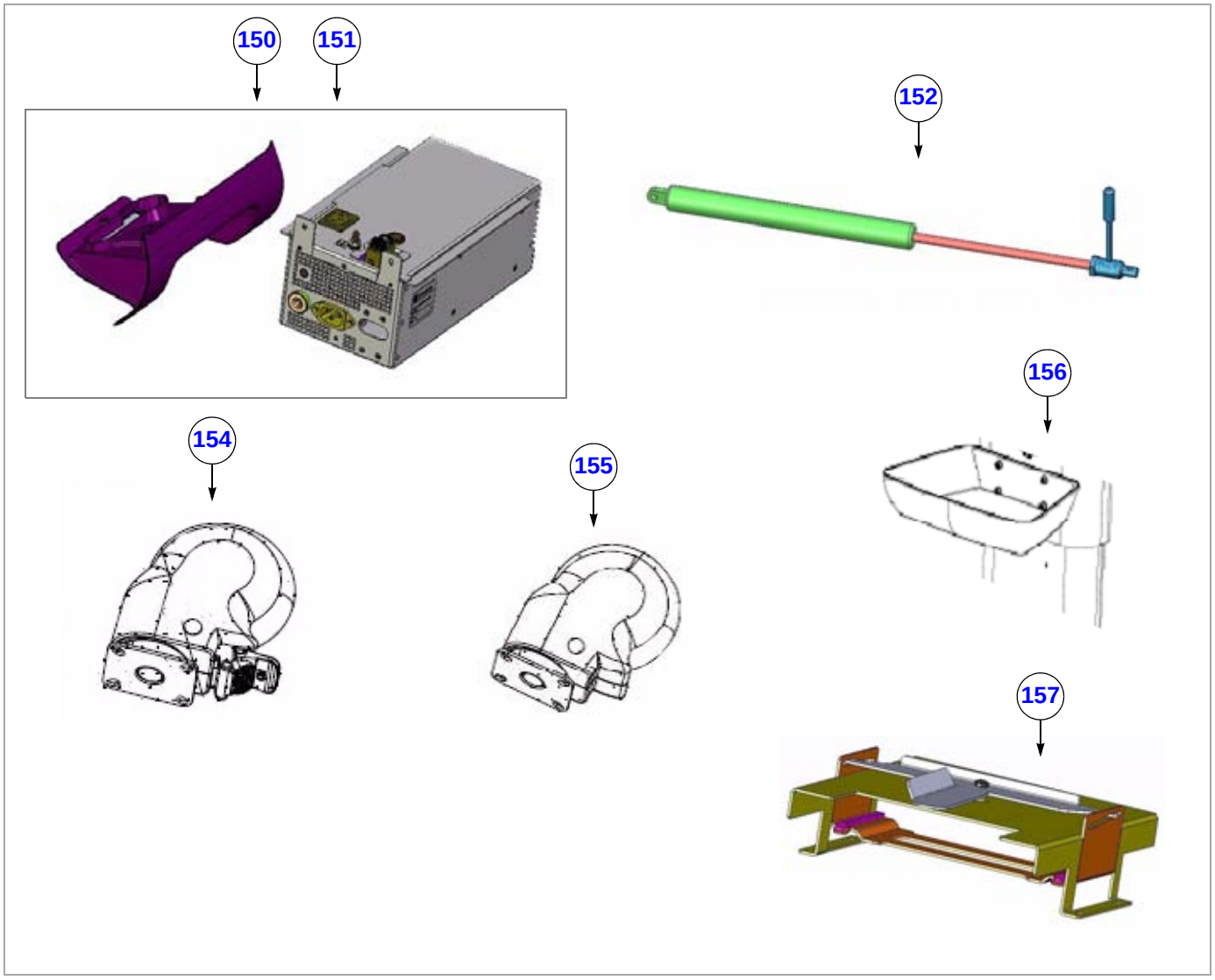


Figure 9-6 SafeLock Cart Sub FRUs - Diagram 1

Table 9-7 SafeLock Cart Sub FRUs - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	BT06	BT09
150	AC Distribution Assy 220-240V	S2423305	2410247-2		✔	✔
151	AC Distribution Assy 100-120V	S2423349	2410247-4 2410247-6		✔	✔
152	Gas Spring	S2423307	2418914		✔	✔
153	Screw Kit for SafeLock Cart BT09	S2423344			✔	✔
154	Front Wheel Kit (contains one wheel)	2415041-2			✔	✔
155	Rear Wheel Kit (contains one wheel)	2415042-2			✔	✔
156	Vivid-i™ SafeLock Cart Basket	2417881-2			✔	✔
157	DVD Holder	S2421050		5376586		✔

Figure 9-7 SafeLock Cart Sub FRUs - Diagram 2

Table 9-8 SafeLock Cart Sub FRUs - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	BT06	BT09
158	External Battery Charger	2417221			✔	✔
159	Cable: Vi Cart Power Cable USA/Canada	2269460-2			✔	✔
160	Cable: Vi Cart Power Cable Europe (Germany; France; Spain [220V]; Portugal; Italy; Switzerland)	2418616			✔	✔
161	Cable: Vi Cart Power Cable UK/HK/Singapore	2415383-4			✔	✔
162	Cable: Vi Cart Power Cable Denmark	2415383-9			✔	✔
163	Cable: Vi Cart Power Cable Australia	2415383-7			✔	✔

Figure 9-8 SafeLock Cart Sub FRUs - Diagram 3

Table 9-9 SafeLock Cart Sub FRUs - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	BT06	BT09
164	Cable: Vi Cart Power Cable Israel	2415383-10			✔	✔
165	Cable: Vi Cart Power Cable Japan	2415383-5			✔	✔
166	Cable: Vi Cart Power Cable China	2415383-6			✔	✔
167	Cable: Vi Cart Power Cable India	2421019			✔	✔
168	TEE RS Probe Adaptor	2420124			✔	✔
169	Vivid-i™ VGA Adaptor	2420728			✔	✔

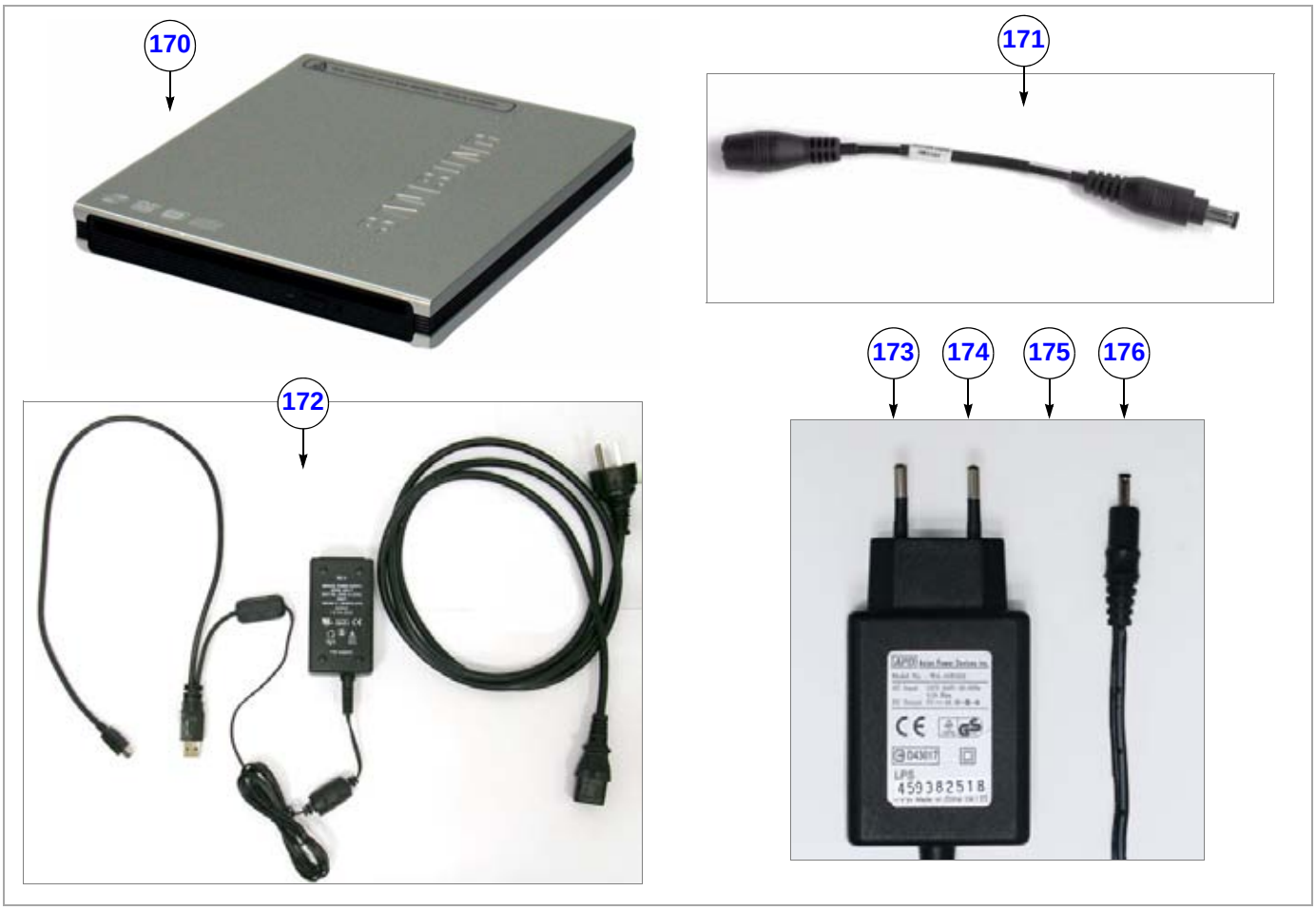


Figure 9-9 SafeLock Cart Sub FRUs - Diagram 4

Table 9-10 SafeLock Cart Sub FRUs - Diagram 4

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	BT06	BT09
170	Stand-alone DVD Samsung	2421141-2			✔	✔
171	Cart Upgrade Samsung DVD Kit	2421168			✔	✔
172	Medical Grade 5V Power Supply for DVD Samsung Universal	2421169			✔	✔
173	Medical Grade 5V Power Supply for DVD Addonics US	2418301			✔	✔
174	Medical Grade 5V Power Supply for DVD Addonics UK	2418302			✔	✔
175	Medical Grade 5V Power Supply for DVD Addonics EU	2418303			✔	✔
176	Medical Grade 5V Power Supply for DVD Addonics AU	2418304			✔	✔

9-3-4 Electro Mechanical Parts

Figure 9-12 Electro Mechanical Parts - Diagram 1

Table 9-16 Electro Mechanical Parts - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
501	Internal Battery Pack (Black)	S2423267					✔	✔
502	Vivid-i™ Operator Panel without ECG (Keyboard Assy.)	S2423357		5376322			✔	
503	Vivid-q™ Operator Panel without ECG (Keyboard Assy.)	S2423358		5376322				✔
504	Trackball	S2423360					✔	✔

Figure 9-13 Electro Mechanical Parts - Diagram 2

Table 9-17 Electro Mechanical Parts - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
508	Vivid-i™ ACDC Mitac	S2422706	2378947-3 2416024-2	5391062			✔	✔
509	AC Adaptor (Japan only)	2416024-2		S2422706			✔	✔
510	AC Adaptor (ROW)	2378947-3		S2422706			✔	✔
511	VGA Splitter	5390022					✔	✔
512	LCD Panel Kit	S2420027	2410809 S2422471			6.2.0 build 124	✔	✔
513	LCD Panel Kit	2410809		S2420027 S2422471		6.1.0 build 109	✔	✔
514	LCD Panel Kit	S2422471	2410809	S2420027		6.2.0 build 124	✔	✔

Figure 9-14 Electro Mechanical Parts - Diagram 3

Table 9-18 Electro Mechanical Parts - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
515	Fans and Speakers Kit	2412826					✔	✔
516	AC Power Jumper Set (100-120 V & 220-240 V)	S420132-2				9.0.0 build 52	✔	✔
517	LAN Isolation Box & Cable Kit	2409727				6.1.0 build 109	✔	✔
518	Chain Test Jig	2404597				6.1.0 build 109	✔	✔
519	Pencil Probe Jig	2414484				6.1.0 build 109	✔	✔
520	TEE RS Probe Adaptor	2420124				6.1.0 build 109	✔	✔
521	Vivid-i™ VGA Adaptor	2420728				6.1.0 build 109	✔	✔

Figure 9-15 Electro Mechanical Parts - Diagram 3

Table 9-19 Electro Mechanical Parts - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
522	Hard Disk Duplicator Service Tool (Vivid-i™/Vivid-q™ and Vivid™ S5/Vivid™ S6)	S2424597	2414958-2			6.1.0 build 109	✔	✔
523	SATA Hard Disk Service Kit (Vivid-i™/Vivid-q™)	S2424594			2421594 2416155		✔	✔
524	Vivid-q™ Operator Panel w/o ECG (Keyboard Assy)	5376323	S2423358					✔
525	Vivid-i™ Operator Panel w/o ECG (Keyboard Assy)	5376322	S2423357				✔	
526	AC/DC Mitac w/Reverse Polarity Preventor	5391062	S2422706				✔	✔

9-3-5 Electronic Parts

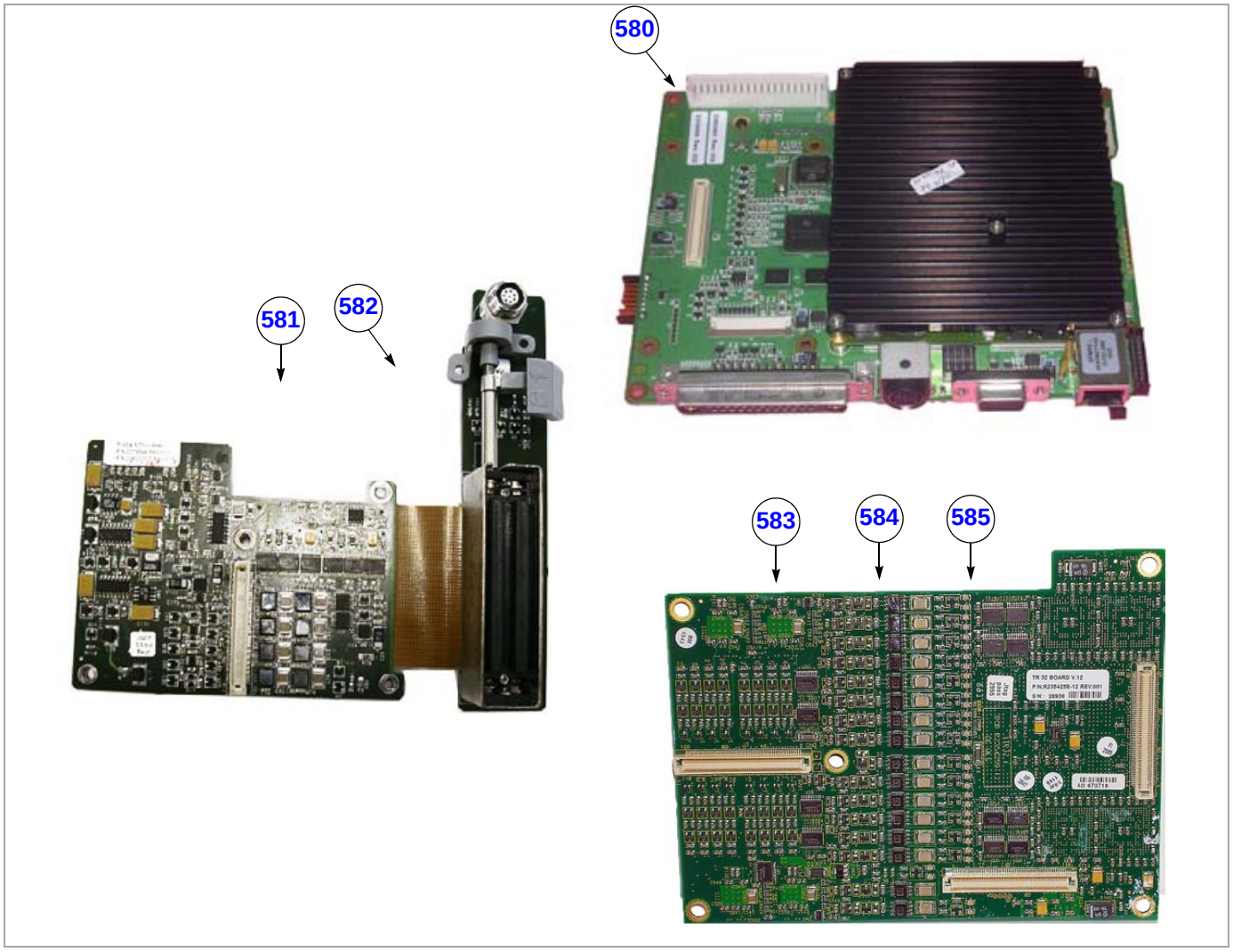


Figure 9-16 Electronic Parts - Diagram 1

Table 9-20 Electronic Parts - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
580	BEP Service Kit	2421594			S2424594	6.1.0 build 109	✔	✔
581	Probe & MUX Assy.	2379846-4		S2379846-5		6.1.0 build 109	✔	✔
582	Probe & MUX Assy.	S2379846-5	2379846-4			6.2.0 build 158	✔	✔
583	TR32 Board	2354258-7		S2354258-7		6.1.0 build 109	✔	✔
584	TR32 -V7 Board	S2354258-7	2354258-7			6.1.0 build 109	✔	✔
585	TR32 -V12 Board	S2423369	S2354258-7 2354258-7			9.1.0 build 66	✔	✔

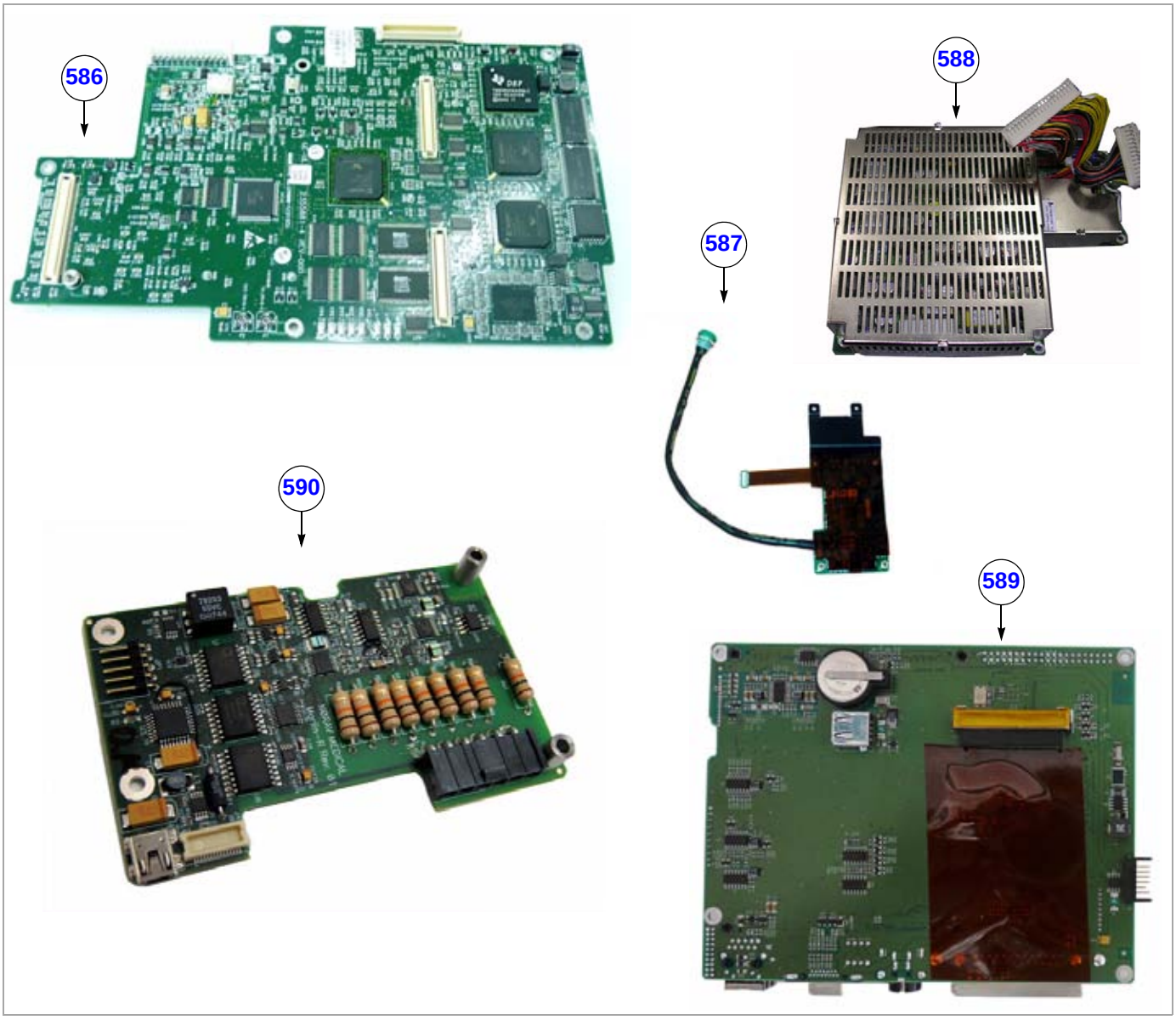


Figure 9-17 Electronic Parts - Diagram 2

Table 9-21 Electronic Parts - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
586	RFI Board AM	S2418295	2355880-4			9.0.0 build 52	✔	✔
587	ECG Module Assy. Rev 3	R2421861	2369811		2416155	6.1.0 build 109	✔	✔
588	DC Power Supply LV and HV	S2403248-4	2416397-2			6.2.0 build 158	✔	✔
589	SATA BEP Service Kit (Vivid-i™/Vivid-q™)	S2424596			2376515-2	6.1.0 build 109	✔	✔
590	ECG/Respiratory Board Assy. Kit	5394902					✔	✔

9-3-6 Cables

Figure 9-18 Cables - Diagram 1

Table 9-22 Cables - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
630	Cable: USB to SCSI Converter	2411889				✔	✔
631	Cable: Cable and Flex Kit	2410810				✔	✔
632	Cable: ECG Cable - USA	2418831-2	2378938	S2424549 S2424557		✔	✔
633	Cable: ECG Cable - Europe	2418832-2	2378938-2	S2424553 S2424558		✔	✔
634	Cable: External ECG (Respiratory)	2413451				✔	✔
635	Cable: Kit for Samsung DVD T084M/ESBN	S2423965				✔	✔

Figure 9-19 Cables - Diagram 2

Table 9-23 Cables - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
636	Cable: Trunk Cable Service Kit (for USA)	S2424549	2418831-2 (-S2424557)			✔	✔
637	Cable: Lead Wire Kit USA (black, red, white)	S2424557	2418831-2 (-S2424549)			✔	✔
638	Cable: Lead Wire Kit Europe (yellow, red, green)	S2424558	2418832-2 (-S2424553)			✔	✔
639	Cable: Trunk Cable (for Europe)	S2424553	2418832-2 (-S2424558)			✔	✔
640	Cable: Pediatric ECG Cable USA -Service Kit	S2424581				✔	✔
641	Cable: Pediatric ECG Cable Europe -Service Kit	S2424580				✔	✔

Figure 9-20 Cables - Diagram 3

Table 9-24 Cables - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
642	Cable: Vi Power Cable USA 110V	2412094-16				✔	✔
643	Cable: Vi Power CableContinental Europe 2.5A/250V	2412094-2				✔	✔
644	Cable: Vi Power Cable Japan 7A/125V	2412094-3				✔	✔
645	Cable: Vi Power Cable U.K/Sing.Hong. 2.5A/250V	2412094-4				✔	✔
646	Cable: Vi Power Cable Switzerland	2412094-5				✔	✔
647	Cable: Vi Power Cable Denmark 2.5A/250V	2412094-7				✔	✔

Figure 9-21 Cables - Diagram 4

Table 9-25 Cables - Diagram 4

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™	Vivid-q™
						BT11	BT11
648	Cable: Vi Power Cable Australia 2.5A/250V	2412094-9				✔	✔
649	Cable: Vi Power Cable Israel 16A/250V	2412094-10				✔	✔
650	Cable: Vi Power Cable China 10V/250V	2412094-11				✔	✔
651	Cable: Vi Power Cable Argentina/Mexico 10V/250V	2412094-12				✔	✔
652	Cable: Vi Power Cable India	2421020				✔	✔

Table 9-26 Cables - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Vivid-i™				Vivid-q™		
						BT06	BT09	BT10	BT11	BT09	BT10	BT11
672	Cable: Vi Power Cable USA 110V	2412094-16				✔	✔	✔	✔	✔	✔	✔
673	Cable: Vi Power CableContinental Europe 2.5A/250V	2412094-2				✔	✔	✔	✔	✔	✔	✔
674	Cable: Vi Power Cable Japan 7A/125V	2412094-3				✔	✔	✔	✔	✔	✔	✔
675	Cable: Vi Power Cable U.K/Sing.Hong. 2.5A/250V	2412094-4				✔	✔	✔	✔	✔	✔	✔
676	Cable: Vi Power Cable Switzerland	2412094-5				✔	✔	✔	✔	✔	✔	✔
677	Cable: Vi Power Cable Denmark 2.5A/250V	2412094-7				✔	✔	✔	✔	✔	✔	✔

9-3-7 Software

Table 9-27 Software

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
700	Vivid-i™/Vivid-q™ BT11 M3 Software Kit	TBD				TBD	✔	✔

9-3-8 Probes

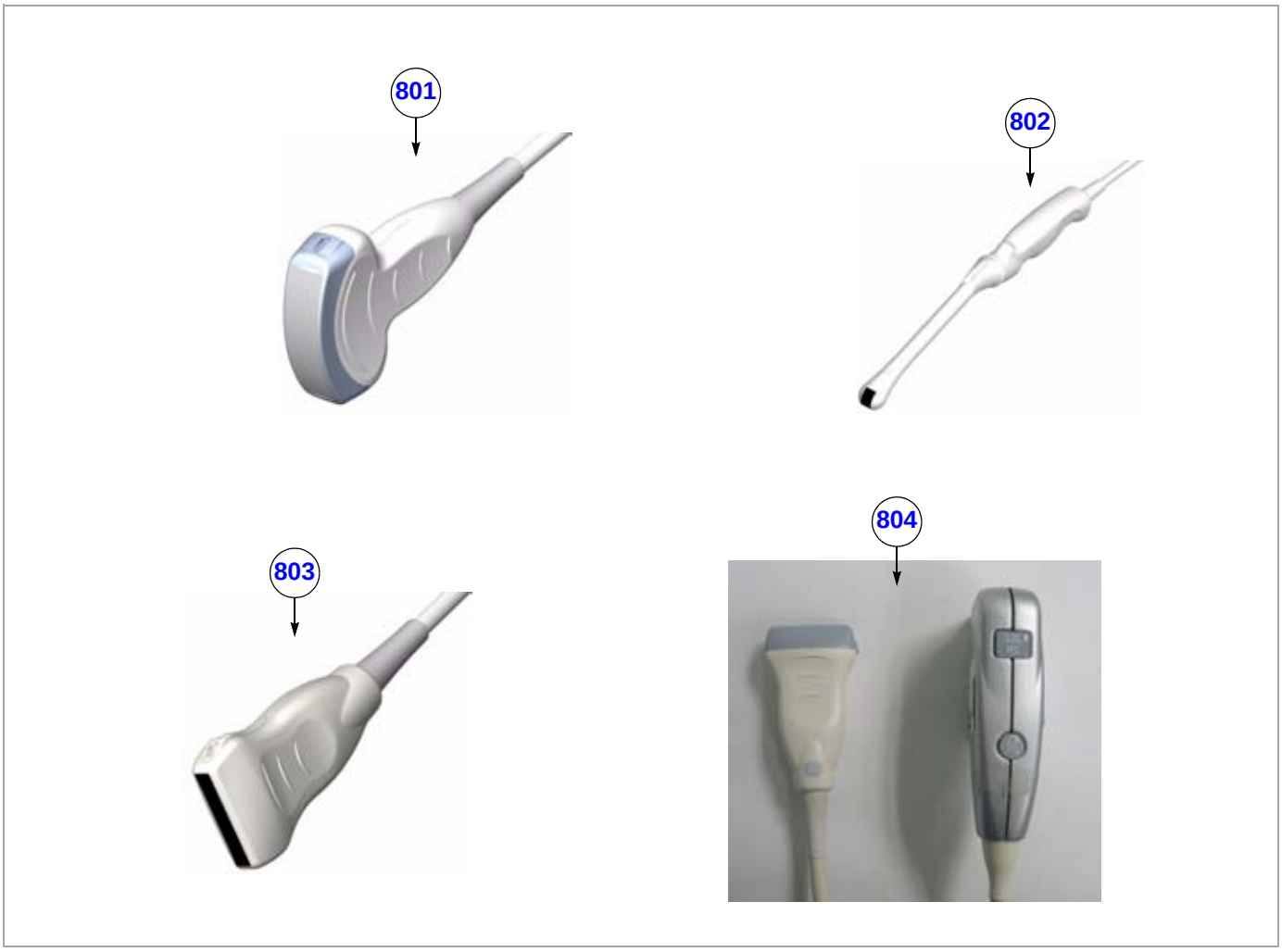


Figure 9-22 Probes - Diagram 1

Table 9-28 Probes - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
800	Probe: Aqunav Umbilical Cord	S2423364				9.0.0 build 52	✔	✔
801	Probe: 4C - RS	5131629				6.1.0 build 109	✔	✔
802	Probe: 8C - RS	2354971				6.1.0 build 109	✔	✔
803	Probe: 8L RS	2376127				6.1.0 build 109	✔	✔
804	Probe: 12L - RS	5154514				6.1.0 build 109	✔	✔

Figure 9-23 Probes - Diagram 2

Table 9-29 Probes - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
805	Probe: i12L - RS	5116678				9.0.0 build 52	✔	✔
806	Probe: 3S- RS	2355686				6.1.0 build 109	✔	
807	Probe: 5S- RS	5133267				6.1.0 build 109	✔	✔
808	Probe: 6S- RS	5198571				9.0.0 build 52	✔	✔
809	Probe: 7S- RS	2377059				6.1.0 build 109	✔	✔
810	Probe: 10S- RS	2377040				6.1.0 build 109	✔	✔

Figure 9-24 Probes - Diagram 3

Table 9-30 Probes - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
811	Probe: 6Tc - RS	KN100104				6.2.0 build 158	✔	✔
812	Probe: 6T - RS	KN100093				6.1.0 build 109	✔	✔
813	Probe: 9T - RS	KN100073				6.1.0 build 109	✔	✔
814	Probe:P2D - RS	2411689				6.1.0 build 109	✔	✔
815	Probe: P6D - RS	2411690				6.1.0 build 109	✔	✔
816	Probe: M4S - RS	5308250				9.0.0 build 52		✔

Section 9-4
Peripherals

Figure 9-25 Approved Peripherals - Diagram 1

Table 9-32 Approved Peripherals - Diagram 1

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
850	Wireless Network Interface Rest of World (excluding Americas, Europe and Japan)	2417391-2		5391285		6.1.0 build 109	✔	✔
851	Wireless Network Interface - Americas	2417388-2		5391285		6.1.0 build 109	✔	✔
852	Wireless Network Interface - Europe	2417389-2		5391285		6.1.0 build 109	✔	✔
853	Wireless Network Interface - Japan	2417390-2		5391285		6.1.0 build 109	✔	✔
854	Portable DeskJet Printer HP-460CB	2412284-3				6.1.0 build 109	✔	✔

Figure 9-26 Approved Peripherals - Diagram 2

Table 9-33 Approved Peripherals - Diagram 2

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
956	Digital B/W Video Printer (Sony UP-D897MD)	2417965				6.1.0 build 109	✔	✔
957	Digital Color Video Printer (Sony UP-D23MD)	2401985				6.1.0 build 109	✔	✔
958	VCR Mitsubishi HS-MD30000E RS-232C PAL S-VHS	066E9513				9.0.0 build 52	✔	✔
959	VCR Mitsubishi HS-MD30000U RS-232C NTSC S-VHS	066E9514				6.1.0 build 109	✔	✔
970	VCR Video Encoder	2412280				6.1.0 build 109	✔	✔

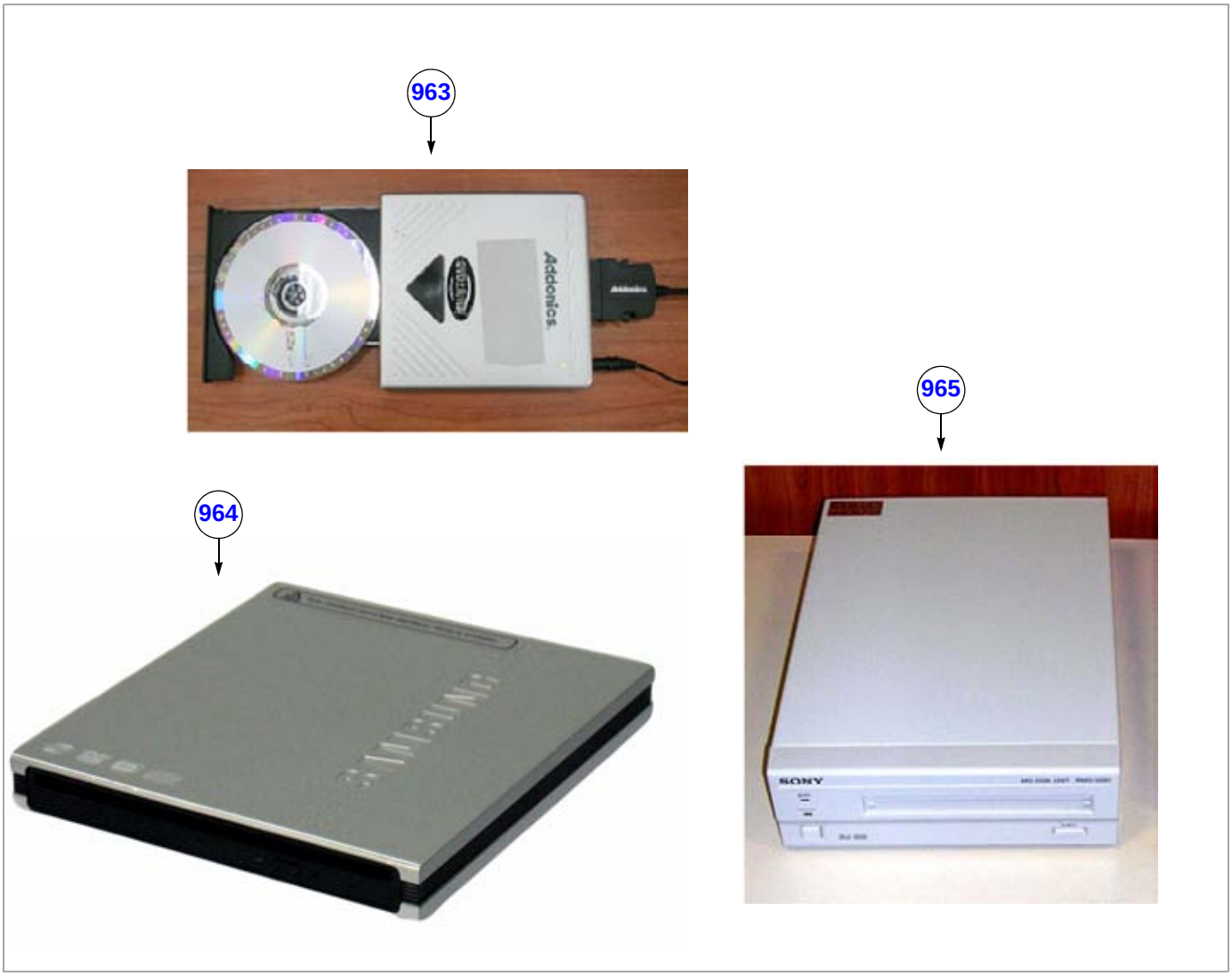


Figure 9-27 Approved Peripherals - Diagram 3

Table 9-34 Approved Peripherals - Diagram 3

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
961	Modem USB	5114058				6.1.0 build 109	✔	✔
962	USB Flash Card (512MB)	2411544				6.1.0 build 109	✔	✔
963	DVD-RW Addonics	2417993-2				6.1.0 build 109	✔	✔
964	DVD-RW Samsung T084M/RSBN Vivid-i™	S2423870	2421141-2			6.2.0 build 124	✔	✔
965	MO Drive 9.1GB 5.25" Ext	066E0677				9.0.0 build 52	✔	✔

Figure 9-28 Approved Peripherals - Diagram 4

Table 9-35 Approved Peripherals - Diagram 4

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
966	Printer: HP8000	5389821				6.2.0 build 158	✔	✔
967	Printer: Sony UP-D25MD	5389822				6.2.0 build 158	✔	✔
968	Printer: CP2025 (230-240V)	066E0429				6.2.0 build 158	✔	✔
969	Printer: CP2025 (110V)	066E0428				6.2.0 build 158	✔	✔
970	Printer: Professional Inkjet HP5400K	S2423332				9.0.0 build 66	✔	✔

Figure 9-29 Approved Peripherals - Diagram 5

Table 9-36 Approved Peripherals - Diagram 5

Item	Part Name	Part Number	Can Replace Part #	Can Be Replaced by Part #	Not Compatible With	Support from S/W Level	Vivid-i™	Vivid-q™
							BT11	BT11
971	Printer: Portable Deskjet HP-450CBI	2411550				6.1.0 build 109	✔	✔
972	Printer: Deskjet Mobile Printer HP470 Service Kit	S2424628				6.1.0 build 109	✔	✔
973	Wireless Network Interface USB Kit	5391285	2417391-2 2417388-2 2417389-2 2417390-2 S2421636			6.1.0 build 109	✔	✔
974	Foot Switch (GP26)	KTZ196270					✔	✔

Section 9-5
Disposables

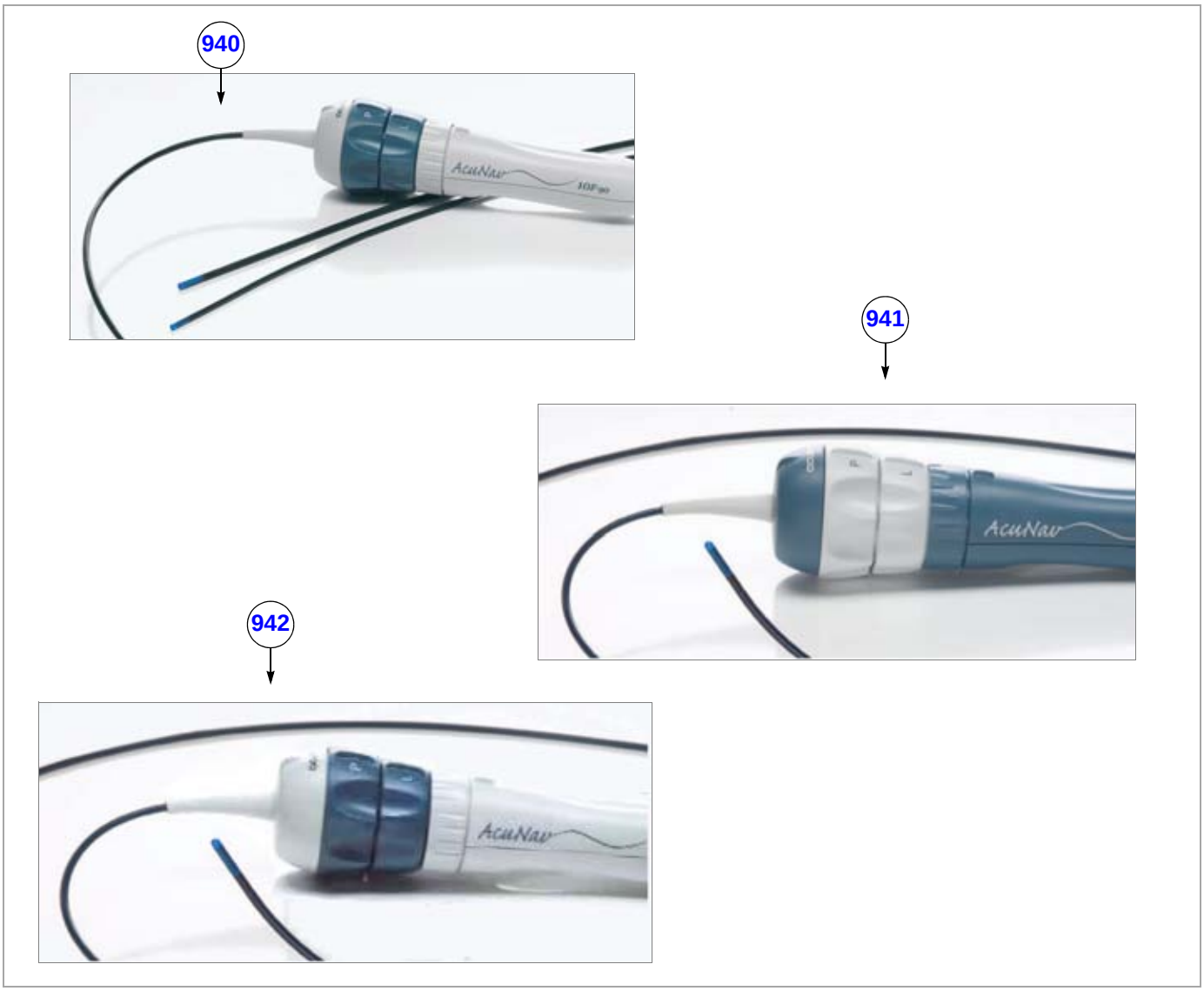


Figure 9-30 Disposables

Table 9-37 Disposables

Item	Part Name	Vivid-i™			Vivid-q™		
		BT09	BT10	BT11	BT09	BT10	BT11
940	Acuson AcuNav™ Intra Cardiac Echo (ICE) Catheter 10F	✔	✔	✔	✔	✔	✔
941	Acuson AcuNav™ Intra Cardiac Echo (ICE) Catheter 8F		✔	✔		✔	✔
942	SoundStar™ 3D Intra Cardiac Echo (ICE) Catheter		✔	✔		✔	✔

Chapter 10
Care and Maintenance

Section 10-1
Overview

10-1-1 Periodic Maintenance Inspections

Having been determined by GE Medical Systems engineers that your Vivid-i™/ Vivid-q™ system has no high-wearing components likely to fail due to frequent use, no Periodic Maintenance Inspections are mandatory. However, some Customer Quality Assurance Programs may require additional tasks and/or inspections to be performed at periods of frequency different from those listed in this manual.

10-1-2 Purpose of Chapter 10

This chapter describes the Care and Maintenance (PM) procedures for the Vivid-i™/ Vivid-q™ ultrasound scanner and its peripherals. These procedures are designed to protect your investment in the system, and are intended to **maintain the quality** of system performance.

After delivery and installation of the Vivid-i™/ Vivid-q™ ultrasound unit, your service representative will contact you to schedule the first of several routine service visits. In addition to routine maintenance by trained Field Service Engineers (FSEs), it is recommended that the procedures described in this chapter be observed as part of your own internal routine maintenance program.

Table 10-1 Contents in Chapter 10

Section	Description	Page Number
10-1	Overview	10-1
10-2	Why Perform Maintenance Procedures?	10-3
10-3	Maintenance Task Schedule	10-4
10-4	Tools Required	10-7
10-5	System Maintenance	10-9
10-6	Probe Maintenance	10-16
10-7	Electrical Safety Tests	10-20
10-8	Excessive Current Leakage	10-32
10-9	Vivid-i™/ Vivid-q™ Inspection Certificates	10-33

10-1-3 Warnings

DANGER: There are several places on the backplane, the AC distribution box, and the DC distribution box that could be dangerous. Be sure to disconnect the system power plug and to open the main circuit breaker before you remove any parts. Proceed with caution whenever power is ON and covers are removed.

DANGER: Do not pull out or insert circuit boards while mains power to the system is ON.

CAUTION: Practice good ESD prevention. Wear an anti-static strap when handling electronic parts and when disconnecting/connecting cables.

CAUTION: Do NOT operate the unit unless all board covers and frame panels are securely in place, to ensure optimal system performance and cooling.
When covers are removed, EMI may be present.

Section 10-2
Why Perform Maintenance Procedures?

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Vivid-i™/ Vivid-q™ Inspection Certificates (see page 10 - 33) provide the customer with documented confirmation that the Vivid-i™/Vivid-q™ portable ultrasound scanner is maintained on a periodic basis.

Copies of the Vivid-i™/ Vivid-q™ Inspection Certificates should be kept in the same room as the Vivid-i™/ Vivid-q™ ultrasound scanner, or nearby.

10-2-2 Quality Assurance

In order to gain accreditation from organizations such as the *American College of Radiology* (*USA*), it is the customer's responsibility to have a Quality Assurance program in place for each scanner. The program must be directed by a medical physicist, the supervising radiologist/physician or appropriate designee.

Routine Quality Control testing of the system must be conducted regularly. The same tests are performed regularly during each period, so that changes can be monitored over time and effective corrective action taken, if required.

Testing results, corrective action, and the effects of corrective action, must be documented and maintained on site.

Your GE Medical Systems Service Representative can help you with establishing, performing and maintaining records for a Quality Assurance program. Please contact us for details of your nearest GE Medical Systems Service Representative, who will provide a quotation for this service, as required.

Section 10-3
Maintenance Task Schedule

10-3-1 How Often Should Care & Maintenance Procedures be Performed?

The Customer Care & Maintenance Task Schedule (provided in Table 10-2 on page 10-5) specifies how often the Vivid-i™/ Vivid-q™ ultrasound scanner should be serviced, and outlines items requiring special attention.

NOTE: It is the customer's responsibility to ensure the Care and Maintenance procedures are performed on the Vivid-i™/ Vivid-q™ ultrasound scanner as scheduled in order to retain the high levels of safety, dependability, and system performance.

Your GE Medical Systems Service Representative has an in-depth knowledge of your Vivid-i™/ Vivid-q™ ultrasound scanning system and can best provide competent, efficient service. Please contact us for details of your nearest GE Medical Systems Service Representative, and/or a quotation for services by our qualified professional FSEs.

The service procedures and recommended intervals shown in the Customer Care & Maintenance Task Schedule assumes that you use your Vivid-i™/ Vivid-q™ scanner for an average patient load (10-12 patients per day) and that you do not use it as a primary mobile unit which is transported between diagnostic facilities.

NOTE: If conditions exist which exceed typical usage and patient load, it is strongly recommended to increase the maintenance frequencies.

Table 10-2 Customer Care & Maintenance Task Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Annually	Notes
Clean Probes	•*				* or before each use
Clean Probe Holders	•				
Inspect AC Mains Cable		*	•		*Mobile Unit Check Weekly
Inspect Cables and Connectors			•		
Clean Console			•		
Clean Monitor			•		
Console Current Leakage Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Peripheral Current Leakage Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Surface Probe Current Leakage Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Endocavity Probe Current Leakage Checks					As prescribed in the Probe Manual.
Transesphongeal (TEE) Probe Current Leakage Checks					As prescribed in Probe Manual.
Surgical Probe Current Leakage Checks					As prescribed in Probe Manual.
Measurement Accuracy Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Probe Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Functional Checks				•	Also after corrective maintenance, or as required by your facility's QA program.

Examine the following on a monthly basis:

- Connectors on cables - for any mechanical defects.
- The entire length of electrical and power cables - for cuts or abrasions.
- Equipment - for loose or missing hardware.
- The keyboard - for defects.
- Brakes - for defective operation.

DANGER: To avoid electrical shock hazard, do not remove the panels or covers from the machine. This servicing must be performed by qualified service personnel *only*. Failure to comply, could result in serious injury!

DANGER: If any defects are observed or any system malfunctions occur, DO NOT operate the equipment. Inform a qualified service engineer immediately.

Section 10-4
Tools Required

10-4-1 Special Tools, Supplies and Equipment

10-4-1-1 Specific Requirements for Care & Maintenance

Table 10-3 Overview of Requirements for Care & Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes: anti–static mat, wrist strap and cables for 220 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive Ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Safety Analyzer	46–285652G1	DALE 600 KIT (or equivalent) for electrical tests
SVHS VCR Cassette	E7010GG E7010GF	60 minutes 120 minutes
SVHS VCR Head Cleaner		See VCR user manual for requirements
3.5 MOD MEDIA	E8381AA E8381AB	Blank 128 M disk Blank 230 M disk
5.25” MOD MEDIA	2277190	Blank 2.3 M disk Blank 5.2 M disk
5.25” MOD Disk Cleaning Kit (Vingmed)	066E0674	Sony MOA-D51
3.5 MOD Media Cleaner	2117811	Cleans the diskettes
5.25 MOD Media Cleaner		Cleans the diskettes
3.5 MOD Head Cleaner Kit	2148392	Cleans the drive heads
5.25 MOD Head Cleaner Kit		Cleans the drive heads
Loctite 242	850752P405	Loctite adhesive
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

Table 10-3 Overview of Requirements for Care & Maintenance (cont'd)

Tool	Part Number	Comments
System Service Code		Required in order to enter system diagnostics
User Manual		Current revision
Service Manual		Current revision

Section 10-5
System Maintenance

10-5-1 Preliminary Checks

The preliminary checks take approximately 15 minutes to perform. Refer to the *Vivid-i™/Vivid-q™ User Manual* whenever necessary.

Table 10-4 System Preliminary Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the appropriate details at the top of the Vivid-i™/ Vivid-q™ System Inspection Certificate (see page 10-33). Note all probes and system options.
3	Power-up	Turn the system power ON and verify that all fans and peripherals turn on. Watch the displays during power up to verify that no warning or error messages are displayed.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the monitor and touch panel.
6	Presets	Back-up all customer presets on a CD-RW.

10-5-2 Functional Checks

The functional checks take approximately 60 minutes to perform. Refer to the *Vivid-i™/Vivid-q™ User Manual* whenever necessary.

NOTE: Refer also to Chapter 4 - Functional Checks, for additional details about the functional checks described in this section.

10-5-2-1 System Checks

Table 10-5 System Functional Checks

Step	Item	Description
1	B-Mode	Verify basic B-Mode (2D) operation. Check the basic system controls that affect this mode of operation.
2	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic system controls that affect this mode of operation.
3	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic system controls that affect this mode of operation.
4	M-Mode	Verify basic M-Mode operation. Check the basic system controls that affect this mode of operation.
5	Applicable Software Options[a]	Verify the basic operation of all optional modes such as Multi-Image, 3D, Contrast, Harmonics, Cine, Stress Echo,... etc. Check the basic system controls that affect each the operation of each option.
6	Probe Elements	Perform an Element Test on each probe to verify that all the probe elements and system channels are functional.
7	System Diagnostics	Perform the Automatic Test to verify that all boards are functioning according to specifications.
8	Xmit/Recv Elements	Use the Visual Channel Utility on the 10L probe to verify that all system xmit/recv channels are functional.
9	Keyboard Test	Perform the Keyboard Test Procedure to verify that all keyboard controls are OK.
10	LCD Display	Verify basic LCD display functions. Refer to Chapter 3 of the Vivid-i™/Vivid-q™ User Manual.
11	Measurements	Refer to Chapter 18 of the Vivid-i™/Vivid-q™ User Manual, for measurement accuracy specifications.

a. Some software may be considered as standard, depending upon system model configuration

10-5-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted. Refer to the *Vivid-i™/Vivid-q™ User Manual* for a list of approved peripherals/options.

Table 10-6 GE Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
1	VCR	Verify record/playback capabilities of the VCR. Clean heads and covers if necessary.
2	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
3	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
4	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
5	InSite/iLinq	Verify that InSite is functioning properly. Ensure two-way remote communications. (Warranty & Contract Customers only)
7	ECG	Verify basic operation with customer.
8	DVD-CDRW	Verify that the DVD-CDRW is functioning properly.
9	MOD	Verify that the MOD is functioning properly.

10-5-3 Input Power Checks

10-5-3-1 Mains Cable Inspection

Table 10-7 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall and system.
2	Mains Cable	Inspect the mains cable and its connectors for any damage.
3	Terminals	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Inlet Connector	Verify that the Inlet connector retainer is functional.

10-5-4 Cleaning

10-5-4-1 General Cleaning

Frequent and diligent cleaning of the Vivid-i™/ Vivid-q™ ultrasound unit reduces the risk of spreading infection from person to person, and also helps to maintain a clean working environment.

CAUTION: When performing Cleaning Procedures, to prevent the risk of system damage, always observe the following precautions:

- **Use *only* cleaning materials and solutions (such as Isopropyl Alcohol [IPA]) as recommended in the procedures described in Table 10-8 on page 10-13.**
- **Do not use any solutions or products not listed in the Vivid-i™/Vivid-q™ User Manual.**
- ***Do not spray any liquid directly onto the Vivid-i™/ Vivid-q™ covers, LCD Display or keyboard!***
- **Do not allow any liquid to drip or seep into the system.**
- **Prior to cleaning, turn OFF power to the system.**

Table 10-8 Vivid-i™/ Vivid-q™ System - General Cleaning

Step	Item	Description
1	LCD Display Cover	On a weekly basis, moisten a soft, non-abrasive folded cloth or sponge with a mild, general purpose, non-abrasive soap and water solution. (**Do not use any solution containing abrasive powder or strong chemicals such as, acid or alkaline**). Squeeze excess liquid from the cloth/sponge, them wipe down the top, front, back and both sides of the unit. ***Do not spray any liquid directly onto the unit!*** Rinse the cloth/sponge with clean running water and wipe the unit surfaces again. Use a dry, soft, lint-free cloth to dry the unit surfaces. Wait for the unit surfaces to dry completely. Note: In the event that disinfection is required or any stubborn stains remain, remove them with a soft, dust-free cloth on which a small quantity of isopropyl rubbing alcohol has been absorbed, as described below for cleaning the Keyboard.
2	LCD Display	On a weekly basis, gently wipe the LCD Display with a dry, soft, lint-free non-abrasive folded cloth. Note: In the event that you see a scratch-like mark on the LCD Display, this may be a stain transferred from the Keyboard or Trackball when the LCD Display Cover was pressed from the outside. Proceed as follows: Wipe or dust the stain gently with a soft, dry cloth. If the stain remains, moisten a soft, lint-free cloth with water or a 50-50 mixture of isopropyl alcohol and water that does not contain impurities. Wring out as much of the liquid as possible then wipe the LCD Display again. ***Do not let any liquid drip into the computer!*** Be sure to dry the LCD Display before closing the cover.
3	Control Panel and Keyboard	**Control Panel:** On a weekly basis, moisten a soft, non-abrasive folded cloth or sponge with a mild, general purpose, non-abrasive soap and water solution or general purpose disinfectant. (**Do not use any solution containing abrasive powder or strong chemicals such as, acid or alkaline**). Squeeze excess liquid from the cloth/sponge, them wipe down the Control Panel. ***Do not spray any liquid directly onto the Control Panel!*** Rinse the cloth/sponge with clean running water and wipe the Control Panel again. Use a dry, soft, lint-free cloth to dry the Control Panel. Wait for the Control Panel surface to dry completely. **Keyboard:** Clean the keyboard as described (above) for cleaning the Control Panel. Note: In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, dust-free cloth. Wipe the surface of the keycaps with the cloth, making sure that no liquid drips on or between the keys. Allow to dry.
4	Probe Holders	Clean the probe holders with warm water and a damp cloth to remove all traces of gel (soaking may be required to remove excess gel).
5	MOD	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. MOD disks must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the MOD cartridge.
6	DVD - CDRW Drive	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. CDs must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the CD drive.
7	Peripherals	Clean the peripherals in accordance with the respective manufacturer's directions.

10-5-5 Physical Inspection

Table 10-9 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition.
2	Scratches and Dents	Inspect the system for dents, scratches or cracks.
3	LCD Display Cover	Clean the LCD Display Cover as described in Table 10-8 on page 10-13 Verify ease of *up*/*down* movement and make sure that the LCD Display cover holds its set position when open and that there is no play on the mechanism. Check that the cover latches *open* and *lock* correctly.
4	LCD Display	Clean the LCD Display as described in Table 10-8 on page 10-13 Inspect the LCD Display for scratches and raster burns. Verify proper operation of Contrast and Brightness controls. For details, see LCD Display Adjustment and Calibration on page 3 - 82.
5	Control Panel and Keyboard	Clean the Control Panel and Keyboard as described in Table 10-8 on page 10-13 Inspect the Control Panel and Keyboard. Note any damaged or missing items. (Replace faulty components, as required). Verify proper operation of Control Panel backlighting and TGC sliders.
6	Probe Holders	Clean the probe holders as described in Table 10-8 on page 10-13. Inspect the Probe Holders for cracks or damage.
7	SafeLock Cart	Check all four SafeLock Cart wheels and castors for wear. Check the brakes on each of the two front wheels. Make sure that pressing the brake locks the wheel, preventing it from swivelling or rolling and therefore stopping movement of the SafeLock Cart. Verify that releasing the brakes allows free movement of the SafeLock Cart. Check the SafeLock Cart *raise*/*lower* motion and verify proper operation of the release mechanism.
9	MOD (if option installed)	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. MOD disks must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the MOD cartridge.
10	DVD- CDRW Drive	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. CDs must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the CD drive.
14	Cables and Connectors	Check all internal cable harnesses and connectors for wear, and secure connector seating. Pay special attention to probe strain or bend reliefs.
15	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation or other deterioration, and verify continuity. Tighten the clamps that secure the power cord to the unit and the outlet plug to the cord. Replace the power cord and clamp, as required.
16	Shielding and Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems during scanning.

Table 10-9 Physical Checks (cont'd)

Step	Item	Description
17	Peripherals	Check and clean the peripherals according to the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
18	External I/O	Check all connectors for damage and verify that the labeling is good.
19	Power and System Status Indicators	Check for proper operation of all Power and System Status Indicators.
20	Microphone	Check for proper operation of microphone by recording an Audio Test. For details, refer to Microphone Test on page 4 - 24.
21	Battery	Check that the battery is not damaged, does not leak, does not emit an odor, and is not deformed or discolored. Perform the Battery Parameters Test as described in Battery Parameters Test on page 7 - 103. Observe all warnings and cautions for battery handling, recharging, storing, and/or disposal, as listed in Vivid-i™ and Vivid-q™ Battery Safety on page 1 - 13.

10-5-6 Optional Diagnostic Checks

To complete the periodic maintenance checks, perform the diagnostic tests as described in *Chapter 7 - Diagnostics/Troubleshooting*.

- Review the system error log for any problems.
- Check the temperature log to see if there are any trends that could cause problems in the future.

Section 10-6
Probe Maintenance

WARNING: Any evidence of wear on a probe indicates that it must not be used. Improper handling may easily damage ultrasound probes. See the Vivid-i™/Vivid-q™ User Manual and also refer to the probe manufacturer's handling instructions, for more details.

Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

10-6-1 Probe Checks

Table 10-10 Probe Checks

Step	Item	Description
1	Probe Holder	Check there are no traces of gel on the probe holders. If any gel present, clean the probe holders with warm water and a damp cloth to remove all traces of gel (soaking may be required to remove excess gel).
2	Probes	Check all the probes for wear and tear on the lens, cable and connector. Look for bent pins on the connector and in the connector socket on the unit. Remove any dust from inside the connector sockets. Verify that the EMI fingers around the probe connector socket housing are intact. Check the probe locking mechanism and probe switch. Perform a visual check of transducer pins and connector sockets before connecting a probe. Verify that the system properly recognizes all probes.

10-6-2 Probe Handling

All Vivid-i™/ Vivid-q™ probes are designed and manufactured to provide trouble-free, reliable service. To ensure this, the correct handling of probes is important and the following points should be noted:

- Do not drop a probe or strike it against a hard surface, as this may damage the probe elements and the acoustic lens, or may crack the housing.
- Do not use a cracked or damaged probe. Any evidence of wear indicates the probe must *not* be used. Call your field service representative immediately for a replacement.
- Perform a visual check of the probe pins and system sockets before plugging in a probe
- Avoid pulling, pinching or kinking the probe cable, since a damaged cable may compromise the electrical safety of the probe.
- To avoid the risk of a probe accidentally falling, do not allow the probe cables to become entangled with, or to be caught in the wheels of the system.
- Protect the probe when moving the unit.
- Use a soft cloth and warm, soapy water to clean the probe.

Note: For detailed information on handling endocavity probes, refer to the appropriate supplementary instructions for each probe.

10-6-3 Basic Probe Care

The *Vivid-i™/Vivid-q™ User Manual* and the individual probe manufacturers' handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

NOTE: The most recent, up-to-date information on probes and probe care is available at: http://www.gehealthcare.com/usen/ultrasound/products/probe_care.html

WARNING: Any evidence of wear on a probe indicates that it must not be used. Ultrasound probes can be easily damaged by improper handling. See the Vivid-i™/Vivid-q™ User Manual and also refer to the probe manufacturer's care cards, for more details.

NOTE: Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Always perform a visual check of the probe pins and system sockets before plugging in a probe.

When handling probes, always observe the precautions listed in Probe Handling on page 10 - 16.

The TEE and Interoperative probes often have special usage considerations; always refer to the individual probe manufacturers' handling instructions/user manual.

10-6-4 Probe Cleaning

10-6-4-1 Basic Probe Cleaning

NOTE: For details on general probe cleaning, refer to the information provided in the Vivid-i™/Vivid-q™ User Manual.

NOTE: For specific probe cleaning instructions, refer to the individual probe Users Manual (or care card supplied with the probe).

CAUTION: Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty. DO NOT soak the probe or wipe the probe lens with any product not listed in the Vivid-i™/Vivid-q™ User Manual. Doing so could result in irreparable damage to the probe and/or Vivid-i™/ Vivid-q™ system. Follow the care instructions supplied with the probe.

CAUTION: To help protect yourself from blood-borne diseases when cleaning and handling probes, wear approved, non-allergic disposable gloves.

WARNING: Always disinfect a defective probe before returning it to the manufacturer. Be sure to tag the probe as being disinfected.

10-6-4-2 General Probe Cleaning Instructions

NOTE: For detailed probe cleaning instructions, refer to http://www.gemedicalsystems.com/rad/us/probe_care.html

Warning: Neurological procedures must NOT be performed on a patient with Creutzfield-Jacob disease because probes that have been used for such examinations cannot be adequately sterilized.

Warning: Neurological and intraoperative procedures must be performed with the use of legally marketed, sterile, pyrogen-free probe sheaths. Probes used during neurological surgery must NOT be sterilized with liquid chemical sterilants because of the possibility of neurotoxic residue remaining on the probe.

10-6-4-2-1 Cleaning and Sterilizing Probes Used Externally

Table 10-11 Cleaning & Sterilizing Procedure for Probes Used Externally

Step	Description
1	To protect yourself from blood-borne diseases, wear approved, non-allergic disposable gloves.
2	Do not immerse the connector or its strain relief in solution. Use ultrasound probe cleaning towels. Wash the probe and probe cable in warm soap and water solution (below 80°F). Use only mild non-abrasive soap.
3	Follow the manufacturer's cold sterilization instructions to disinfect the probe, including concentration and soaking time; 10 minutes is a typical disinfecting period.
4	Follow step 3 for a much longer duration to sterilize the probe; 10 hours is a typical cold chemical sterilization duration.
5	When complete, thoroughly rinse the washed lens in clear water. Apply sterile distilled water for at least 60 seconds. Air dry.
6	Check the lens for cracking and the cable insulation for separation.
7	Store the probe in its carrying case.

10-6-4-2-2 Cleaning and Sterilizing Probes Used Internally

Table 10-12 Cleaning & Sterilizing Procedure for Probes (TEE) Used Internally

Step	Description
1	To protect yourself from blood-borne diseases, wear approved, non-allergic disposable gloves.
2	Do not immerse the connector or its strain relief in solution. Use ultrasound probe cleaning towels. Wash the probe and probe cable in warm soap and water solution (below 80°F). Use only mild non-abrasive soap.
3	Follow the manufacturer's cold sterilization instructions to disinfect the probe, including concentration and soaking time; 10 minutes is a typical disinfecting period.
4	Follow step 3 for a much longer duration to sterilize the probe; 10 hours is a typical cold chemical sterilization duration.
5	When complete, thoroughly rinse the washed lens in clear water. Apply sterile distilled water for at least 60 seconds. Air dry.
6	Check the lens for cracking and the cable insulation for separation.
7	Store the probe in its carrying case.

10-6-5 Returning and Shipping of Defective Probes

WARNING: Always disinfect a defective probe before returning it to the manufacturer. Be sure to tag the probe as being disinfected.

CAUTION: To help protect yourself from blood-borne diseases when cleaning and handling probes, wear approved, non-allergic disposable gloves.

Equipment being returned must be properly clean and free of blood and other potentially infectious contaminants.

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstances should a part or equipment be shipped before being visibly clean and properly disinfected.

The purpose of the regulation is to protect employees in the transportation industry, as well as the persons who will receive and/or open the package.

NOTE: The US Department of Transportation (DOT) has ruled that "items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care" are "regulated medical waste" for transportation purposes and must be transported as a hazardous material.

Section 10-7
Electrical Safety Tests

10-7-1 Safety Test Overview

The electrical safety tests in this section are based on and conform to NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the NFPA 99 (for USA) and IEC 60601-1 documents.

WARNING: ***THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 MONTHS ACCORDING TO THE REQUIREMENTS OF THE PATIENT SAFETY STANDARD IEC-EN 60601-1. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE ABOVE-MENTIONED SAFETY INSPECTIONS.***

CAUTION: To avoid the risk of electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The operator and patient must not come into contact with the unit while the tests are being performed.

CAUTION: Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.

Test the system, peripherals and probes for current leakage.

WARNING: ***EXCESSIVE CURRENT LEAKAGE CAN CAUSE FATAL INJURY.***

EXCESSIVE CURRENT LEAKAGE CAN INDICATE DEGRADATION OF INSULATION OR OTHER PART AND COULD POTENTIALLY CAUSE ELECTRICAL FAILURE. DO NOT USE PROBES OR EQUIPMENT THAT HAVE EXCESSIVE CURRENT LEAKAGE.

Important: When the SafeLock Cart is connected to the wall outlet and the main circuit breaker is in the ON position, the AC Box Fan is operated - *even if the system power is turned OFF*.

To minimize the risk of a probe causing electrical shock, the customer should observe the following recommendations:

- Do not use a probe that is cracked or damaged in any way
- Check probe current leakage, as shown below:

Probe	Frequency for Checking
Surface	Once per year (or in accordance with QA program)
Endocavitary	Twice per year (or in accordance with QA program)
Any probe	Whenever damage is suspected

10-7-2 GEMS Current Leakage Limits

The following limits are summarized for NFPA 99 (for USA) and IEC 60601-1 Medical Equipment Safety Standards. These limits are GEMS standards and in some cases are lower than the above standards listed.

Table 10-13 Chassis Current Leakage Limits - Accessible Metal Surfaces

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
USA	N/A	0.3 mA	0.3 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA

Table 10-14 Type BF Applied Part Current Leakage Limits - Non-Conductive (Floating) Surface and Cavity Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	Mains Applied[a]
USA	0.05 mA	0.05 mA	0.05 mA	0.05 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

a. Mains Applied is the Sink Leakage Test. In this test, mains (supply) voltage is supplied to the part or equipment to determine the amount of current that will pass (sink) to Ground if a patient comes into contact with the part.

Table 10-15 Type CF Applied Part Current Leakage Limits - Surgical Probes and ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	Mains Applied[a]
USA	0.01 mA	0.05mA	0.05 mA	N/A	0.025 mA
Other	0.01 mA	0.05 mA	0.05 mA	0.05 mA	0.05 mA

a. Mains Applied is the Sink Leakage Test. In this test, mains (supply) voltage is supplied to the part or equipment to determine the amount of current that will pass (sink) to Ground if a patient comes into contact with the part.

10-7-3 Outlet Test Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

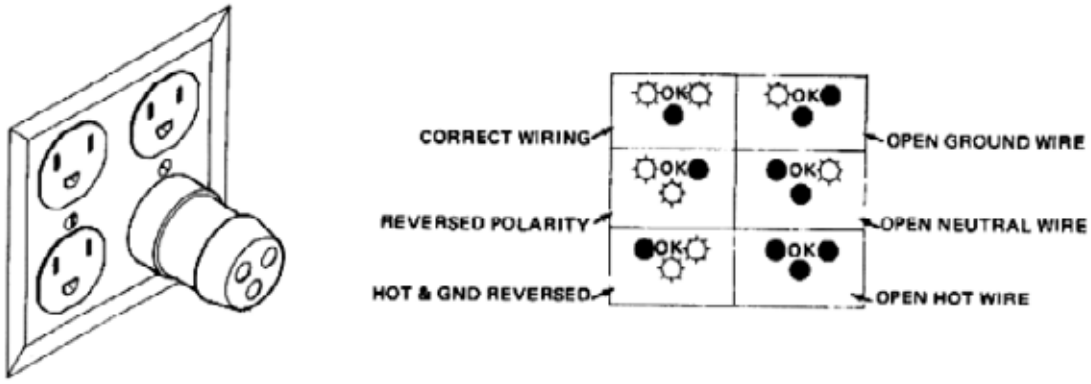


Figure 10-1 Typical Outlet Tester

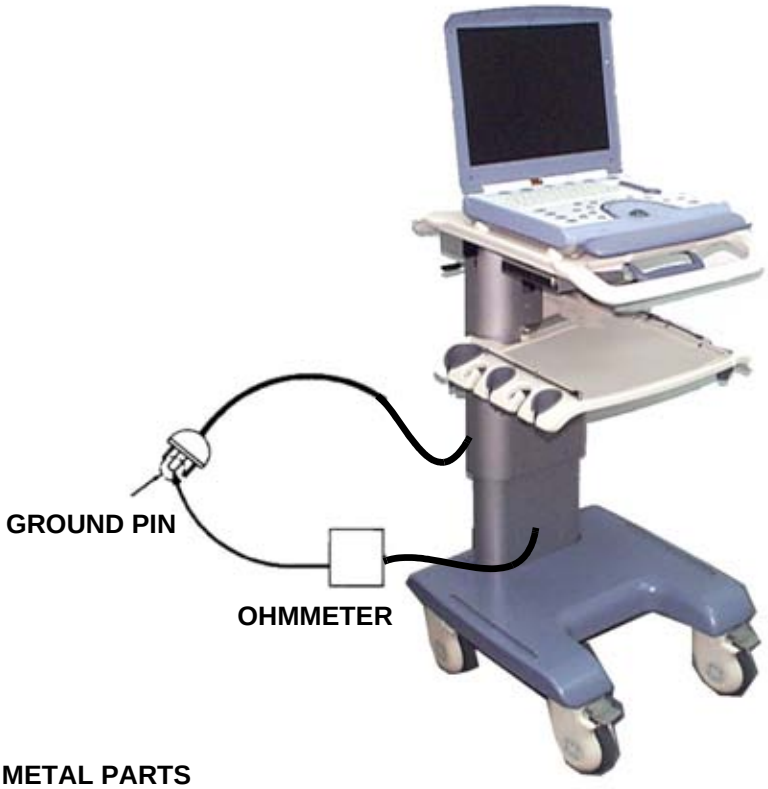
NOTE: No outlet tester can detect the condition in which the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor have been reversed. If later tests indicate high current leakages, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

10-7-4 Grounding Continuity (Systems with SafeLock Cart)

CAUTION **Electric Shock Hazard!**
The patient or operator must not come into contact with the equipment during this test.

NOTE: This test is not valid for stand-alone Vivid-i™/ Vivid-q™systems and is only applicable when the Vivid-i™/ Vivid-q™ is mounted on the SafeLock Cart.

Measure the resistance between the third pin of the attachment plug and any exposed metal parts on the SafeLock Cart. The Ground wire resistance should be less than **0.2** Ohms. Refer to the procedure in the IEC 601-1.1.



ACCESSIBLE METAL PARTS

such as:

a) Potential Equalization Connector
b) Rear Panel Connector
c) Any Caster/Wheel support
d) Any accessible metal screws on rear side of cart

Figure 10-2 Ground Continuity Test

10-7-4-1 Ground Continuity Testing - Generic Procedure

Follow these steps to test the Ground wire resistance:

1.) Turn the Vivid-i™/ Vivid-q™ unit OFF.
2.) Connect one of the Ohmmeter probes to the tested AC wall outlet cable side (Ground pin).
3.) Using the other Ohmmeter probe, touch the exposed metal part of the Vivid-i™/ Vivid-q™ unit.
4) Set the meter **Function** switch to the **Resistance** position.
5) Measure and record the Ground wire resistance.
This should be less than 0.2 Ohms.

10-7-5 Chassis Current Leakage Test

10-7-5-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station, if the Ground wire should break. The test verifies the isolation of the power line from the chassis.

The meter is connected from accessible metal parts of the case to Ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading.

DANGER: Electric Shock Hazard.
When the meter's Ground switch is OPEN, *do not touch the unit!*

CAUTION: Equipment damage possibility.
Never switch the polarity and the neutral status when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the **Polarity** switch and/or the **Neutral** switch. Otherwise, the unit may be damaged.

10-7-5-2 Generic Procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to Ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

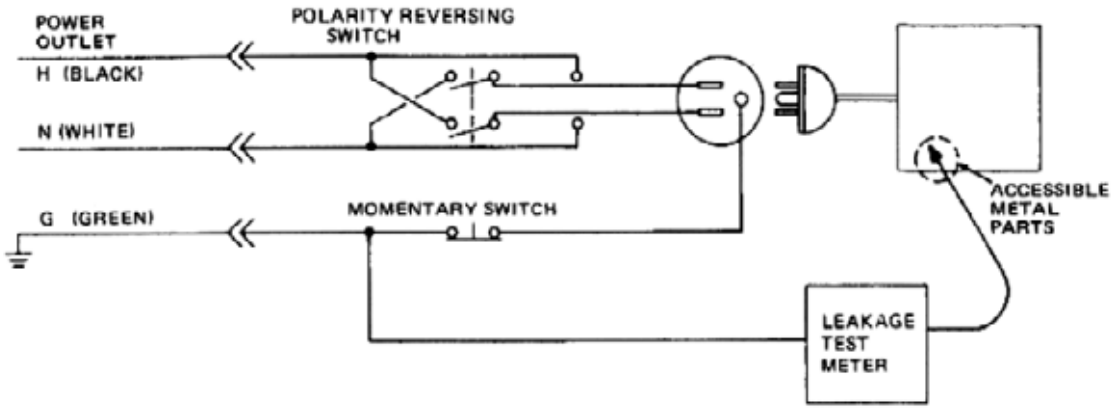


Figure 10-3 Set Up for Chassis Source Current Leakage, IEC 601-1 Clause 19 Continuous Current Leakage and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test be plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to Ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 10-13 on page 10-21.

10-7-5-3 Data Sheet for Chassis Source Current Leakage

The Chassis Source Current Leakage Test passes when all readings measure less than the values shown in Table 10-13. Record all data on the Vivid-i™/ Vivid-q™ System Inspection Certificate (see page 10-33).

Table 10-16 Typical Data Sheet for Chassis Source Current Leakage Test

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Probe Connector	Test 2 Caster Wheel	Test 3 CRT	Test 4 (Optional)	Test 5 (Optional)
Enter Name of tested peripheral here:							
ON	NORM	OPEN					
ON	NORM	CLOSED					
ON	REV	OPEN					
ON	REV	CLOSED					
OFF	NORM	OPEN					
OFF	NORM	CLOSED					
OFF	REV	OPEN					
OFF	REV	CLOSED					

10-7-6 Isolated Patient Lead (Source) Leakage – Lead-to-Ground

10-7-6-1 Definition

This test measures the current which would flow to Ground from any of the isolated ECG leads. The meter simulates a patient who is connected to the monitoring equipment and is grounded by touching some other grounded surface.

Measurements should be made with the Ground *open* and *closed*, with power line polarity *normal* and *reversed*, and with the ultrasound console OFF and ON. For each combination the operating controls, such as the lead switch, should be operated to find the worst case condition.

CAUTION: Equipment damage possibility. To avoid damaging the unit, never switch the polarity and the neutral status when the unit is powered ON. Be sure to turn the unit power OFF before switching them, using the **Polarity** switch and/or the **Neutral** switch.

10-7-6-2 Generic Procedure

Measurements should be made with the Ground **Open** and **Closed**, with power line polarity **Normal** and **Reversed**, and with the Vivid-i™/ Vivid-q™ unit **ON** and **OFF**. For each combination, the operating controls (such as, the lead switch) should be operated to find the worst case condition.

.

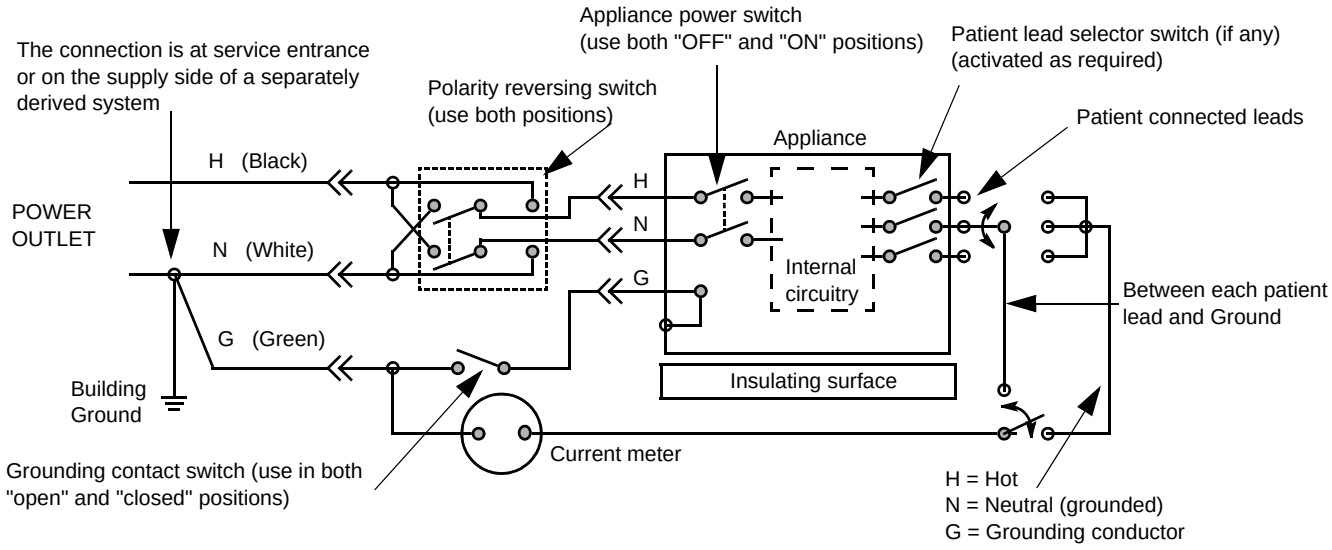


Figure 10-4 Test Circuit for Measuring Non-Isolated Patient Leads

10-7-7 Isolated Patient Lead (Source) Leakage – Lead-to-Lead

NOTE: Refer to the procedure in the IEC 60601-1.

10-7-8 Isolated Patient Lead (Sink) Leakage - Isolation Test

NOTE: Refer to the procedure in the IEC 60601-1.

CAUTION: Line voltage is applied to the ECG leads during this test. To avoid the risk of possible electric shock, the system being tested must not be touched by anyone (patient or operator), while the ISO TEST switch is depressed.

NOTE: It is not necessary to test each lead individually, or power condition combinations, as required in previous tests.

10-7-8-1 Data Sheet for ECG Current Leakage

The test passes when all readings measure less than the values shown in the tables below. Record all data on the Vivid-i™/ Vivid-q™ System Inspection Certificate (see page 10-33).

Table 10-17 Maximum Allowance Limit for ECG Lead Leakage Test to Ground

	AC Power Source	Maximum Allowance Limit	
		GROUND OPEN	GROUND CLOSED
Patient Lead-to-Ground Current Leakage Test and Patient Lead-to-Lead Current Leakage Test	115V	10uA	10uA
	220/240V	500uA	10uA

Table 10-18 Maximum Allowance Limit for ECG Lead Isolation Sink Test

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

Table 10-19 Typical Data Sheet for ECG Lead-to-Lead Test

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

10-7-9 Probe Current Leakage Test

10-7-9-1 Definition

This test measures the current that would flow to Ground (from any of the probes) through a patient who is being scanned, and who becomes grounded by touching some other grounded surface.

10-7-9-2 Generic Procedure

Measurements should be made with the Ground OPEN and CLOSED, with power line polarity *Normal* and *Reversed*, and with the unit OFF and ON. For each combination, the probe must be active to find the worst case condition.

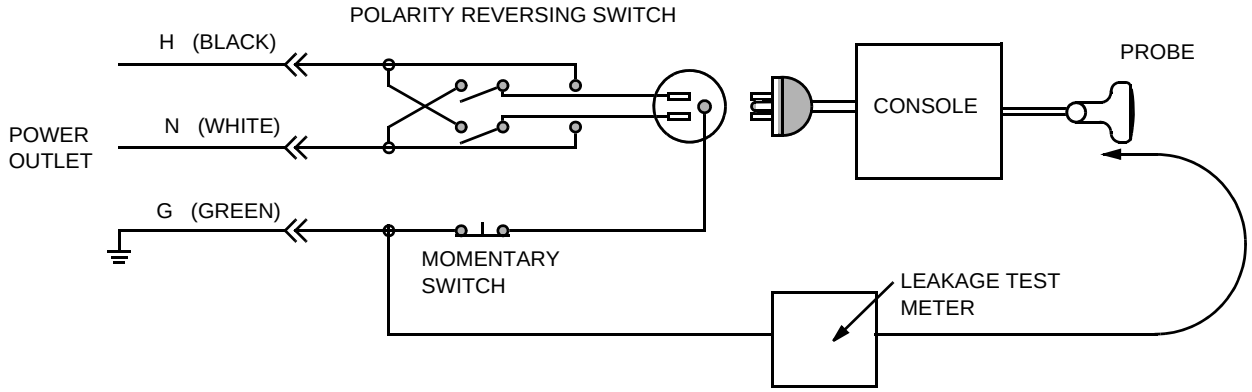


Figure 10-5 Set Up for Probe Current Leakage Test

NOTE: Each probe will have a certain amount of current leakage, depending on its design. Small variations in probe current leakages are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.

10-7-9-3 No Meter Probe Adapter Procedure

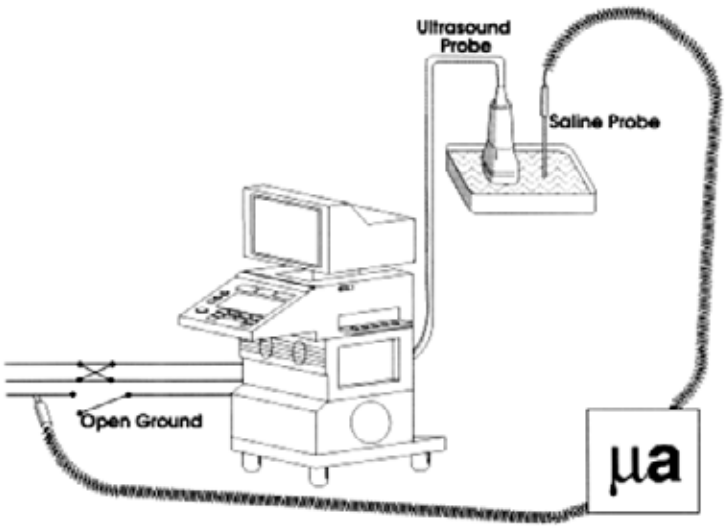


Figure 10-6 Check Without Probe Adapter

Follow these steps to test each transducer for current leakage.

1.) Turn the Vivid-i™/ Vivid-q™ unit OFF.
2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
3.) Plug the external probe into the meter “EXTERNAL” connector.
4.) Set the meter's “FUNCTION” switch to EXTERNAL position.
5.) Connect the probe for test with the connector of the console.
6.) Add the saline probe and the imaging area of the probe into the saline bath.
7.) Turn unit power ON for the first part; turn it OFF for the second half.
8.) Depress the ISO TEST rocker switch and record the highest current reading.
9.) Follow the test conditions described in Table 10-20 for every transducer.
10.) Keep a record of the results with other hard copies of Preventive Maintenance data or corrective actions taken.

10-7-9-4 Data Sheet for Transducer Source Current Leakage

The test passes when all readings measure less than the values shown in Table 10-14 and Table 10-15. Record all data on the Vivid-i™/ Vivid-q™ System Inspection Certificate (see page 10-33).

CAUTION: When power to the unit is ON, *never* switch the Polarity and the status of Neutral. Be sure to turn OFF power to the unit before switching them, using the POLARITY switch and/or the NEUTRAL switch. *Failure to comply with this warning may cause damage to the unit!*

Table 10-20 Typical Data Sheet for Transducer Source Current Leakage Test

Transducer Tested:			
Unit Power	**Tester Power POLARITY Switch**	**Tester GROUND or NEUTRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

Section 10-8
Excessive Current Leakage

10-8-1 Possible Causes of Excessive Current Leakage

10-8-1-1 Chassis Fails

Check the Ground on the power cord and plug for continuity. Ensure the Ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all Grounds. Ensure star washers are under all Ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high current leakages, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

10-8-1-2 Probe Fails

Test the probe in another connector to verify if the fault lies with the probe or the scanner.

NOTE: Each probe will have some amount of leakage, depending on its design. Small variations in probe current leakages are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable current leakage for body surface contact probes differs from that of inter-cavity probes. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive current leakage is slot dependent, inspect the system connector for bent pins, poor connections, and Ground continuity.

If the problem remains with the probe, replace the probe.

10-8-1-3 Peripheral Fails

Tighten all Grounds. Ensure star washers are under all Ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

10-8-1-4 Still Fails

If all else fails, begin isolation by removing the probes, external peripherals, then the on-board peripherals (one at a time) while monitoring the current leakage measurement.

10-8-1-5 New Unit

If the current leakage measurement tests fail on a new unit and if the situation cannot be corrected, submit a Safety Failure Report to document the system problem. Remove the unit from operation.

10-8-1-6 ECG Fails

Inspect cables for damage or poor connections.

Section 10-9
Vivid-i™/ Vivid-q™ Inspection Certificates

Vivid-i™/ Vivid-q™ System Inspection Certificate

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

*Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array, or other

Functional Checks (if applicable)	**OK?** or **N/A**
B-Mode (2D) Function	
Doppler Mode Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Options	
Applicable Hardware Options	
Control Panel	
Monitor	
Measurement Accuracy	
GE-approved Peripherals	

Physical Inspection and Cleaning (if applicable)	**Inspect**	**Clean**
Console		
Monitor		
Touch Panel		
Air Filter		
Probe Holders		
External I/O		
Wheels, Brakes & Swivel Locks		
Cables and Connectors		
GE-approved Peripherals (VCR, CD-RW, MOD, Printers)		

Comments:

Vivid-i™/ Vivid-q™ Electrical Safety Inspection Certificate

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct Ground & wiring config.)				
System Ground Continuity				
Chassis Source Current Leakage - Probe				
Chassis Source Current Leakage - Caster				
Chassis Source Current Leakage - CRT				
Patient Lead Source Leakage (Lead-to-Ground)				
Patient Lead Source Leakage (Lead-to-Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Current Leakage				
Peripheral 1 Ground Continuity				
Peripheral 2 Current Leakage				
Peripheral 2 Ground Continuity				
Peripheral 3 Current Leakage				
Peripheral 3 Ground Continuity				
PROBES				
Probe Number (from page 10-33)	**Max Value Allowed**	**Max Value Measured**	**OK?**	**Comments**
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

Final Check: All system covers are in place. The Vivid-i™/ Vivid-q™ system scans with all probes, as expected.

Accepted by:

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